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ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR 1997

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BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS

HOUSE OF REPRESENTATIVES

ONE HUNDRED FOURTH CONGRESS

SECOND SESSION

SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT

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JAMES D. OGSBURY, BOB SCHMIDT, JEANNE WILSON, and DONALD M. MCKINNON,
Staff Assistants

PART 6

DEPARTMENT OF ENERGY

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Atomic Energy Defense Activities 909
Defense Nuclear Facilities Safety Board 1378

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HEARINGS

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ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR 1997

TUESDAY, MARCH 26, 1996.

U.S. DEPARTMENT OF ENERGY

WITNESSES

REAR ADMIRAL RICHARD J. GUIMOND, PRINCIPAL DEPUTY ASSISTANT SECRETARY FOR ENVIRONMENTAL MANAGEMENT

DANIEL A. DREYFUS, DIRECTOR, OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

LAKE H. BARRETT, DEPUTY DIRECTOR, OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

Mr. KNOLLENBERG [presiding]. The committee meeting will come to order.

I welcome the opportunity to hear testimony concerning two very important programs of the Department of Energy, they being the Environmental Management and Civilian Radioactive Waste Program. I am pleased to welcome Rear Admiral Richard Guimond here—and in case any of you weren't aware of the business attire and the military attire—who is the Principal Deputy Assistant Secretary for Environmental Management; and Dr. Daniel Dreyfus, Director of the Office of Civilian and Radioactive Waste Management. Both witnesses will testify. We will hear first from Admiral Guimond.

The floor is yours.

ENVIRONMENTAL MANAGEMENT OVERVIEW

Admiral GUIMOND. Thank you very much, Mr. Knollenberg, members of the subcommittee. I appreciate the opportunity to appear before you to discuss the Department of Energy's Environmental Management Program. I have a lengthy written statement and will summarize.

We are here to present our fiscal year 1997 budget for the Office of Environmental Management (EM). First I would like to give you a little background to let you know who we are and what we are all about.

We are often called the cleanup program of the DOE. But cleanup, to many people, may only mean digging dirt, treating ground water, or discarding old, contaminated materials. Certainly we do these things, but we do much more than this. This is a simplified concept of cleanup, and we are involved with a whole array of other kinds of activities.

For example, our highest priority task involves the safety and security of more than 20 metric tons of weapons-grade plutonium, enough for thousands of nuclear warheads. We are currently converting liquid and residues that contain plutonium, which can readily catch fire, into forms that can be safely stored for decades. We also ensure that U.S. Navy nuclear warships are sailing by dealing with spent nuclear fuel.

We manage over 100 million gallons of high-level radioactive waste that is so radioactive that, if it comes in contact with people, you could get a lethal dose of radiation within a very short time. We often might be better called the nuclear materials safety and security program as well as the cleanup program.

We are now responsible for the entire portion of the nuclear weapons complex that is no longer involved with weapons activities. We are responsible for managing facilities that cover a land area 50 times the size of the District of Columbia or twice the size of the State of Delaware. We have thousands of buildings and plant operations on our sites. We are responsible for activities that present urgent risks that need constant vigilance to maintain them in a safe manner.

For the second straight year, we are requesting less in budget authority than the previous year. This year we are asking for $5.88 billion in new budget authority. In addition, we are asking for $182 million proposed in the administration's fiscal year 1997 budget to support privatization. This is part of a $1.4 billion package that the President has requested within the DOE and elsewhere for privatization activities.

Congress has voiced concerns over EM's cost and progress. We have heard your concerns; we respect your concerns and have vigorously acted on them. To see how aggressively we have addressed these concerns, I would like you to look at some of our results. We are now getting to results on a massive scale. We are moving contaminated dirt instead of paper; we are treating more wastes than before and reducing significant threats to the public and to the environment.

This slide shows you that this year we will be doing significantly more in cleanup than we are in paper analysis, or studies, if you will. We have turned the corner to where more of our dollars, more of our activities, actually result in real cleanup-type activities. I think this has been a milestone for us so that you can now see significant value for the investment in our program.

ENVIRONMENTAL MANAGEMENT ACCOMPLISHMENTS

We have started operations at the largest waste treatment plant in the world, which is at this moment converting unsafe liquid high-level nuclear waste to a safer, solid glass form, ready for disposal.

We have restarted the Savannah River Site reprocessing canyon and stabilized over 20 percent of the liquid plutonium nitrate solutions that posed a threat of uncontrolled nuclear reaction.

At the Hanford site, we are removing the deteriorating spent fuel from the aging K-Basins located near the Columbia River. This fuel is expected to be removed by the end of 1999 and placed in a dry, state-of-the-art, new facility conditioned in a form suitable for safe, long-term interim storage.

Also at Hanford we have removed over 56,000 pounds of hazardous carbon tetrachloride from the soil above the ground water, and we have treated 17 million gallons of ground water this past year.

We have completed 75 large-scale environmental cleanups in 1995, which is a 134 percent increase over the previous year. We have completed 200 so far, and we have 500 to go.

We have completed about 119 interim actions, 17 decommissioning actions, and we have cleaned up mill tailings at over 5,000 residences. Five million cubic yards of tailings, soil, and rubble have been stabilized, contained or otherwise addressed.

To put this in perspective, if we stacked this waste on the 64 lanes of the Cloverlane Bowling Alley in Lavonia, the pile would be 2 miles high.

Mr. KNOLLENBERG. Why did you mention Cloverlane?

Admiral GUIMOND. I have a cousin living in Lavonia, and I knew you were from that area. I asked him where was the nearest bowling lane you might spend time in, and he indicated Cloverlane might be it.

At the Fernald Site in Ohio, we have completed all major environmental restoration milestones on or ahead of schedule, including several major removal actions.

Last year at Oak Ridge we treated 3.1 million pounds of mixed waste to destroy hazardous PCBs. In 1995, 50 new or improved technologies were demonstrated and 24 were made available for transfer to implementation; 13 were implemented at waste cleanup sites.

You can see from this, we have a lot of results. Our results are moving ahead. We still have a long way to go, and we are going to try to continue to make those improvements.

MANAGEMENT INITIATIVES

But the improvements are not just related to the cleanup activities, they are also involved in the way we have been doing business. We have been working closely with labor unions at our Mound Plant in Ohio, coming up with a new labor agreement which provides a new model for site cleanup, closing issues that have been in the way of increasing productivity and helping to improve work force stability.

We have established a total of 11 Site-Specific Advisory Boards across the complex. For example, working with the Citizens Task Force at the Fernald facility, we have come up with a plan they believe is good for the community and that will result in over a billion dollars of savings over the life of the cleanup.

In the area of cutting costs, which is of particular importance to the Congress and is certainly of great importance to us, in 1993 there was a projection that the annual budget for our program would require about $8.5 billion by the year 2000 and nearly that amount by this year. We have dramatically cut the cost of doing business. In 1997 we will meet our obligations with less than $6 billion.

Productivity is up dramatically, unit costs are going down, and we have saved billions of dollars, with more to come.

Over the last year we have reduced our support service cost at headquarters and in the field by 55 percent. We have focused on reducing our headquarters overall costs by over 36 percent. Across the complex we have reduced our contractor force by over 20,000 employees.

We have cut duplicate oversight by eliminating 156 DOE orders. This has been a significant improvement to helping things get on more quickly.

We have granted more decision-making authority to our field managers and reduced unnecessary headquarters oversight.

We have come up with appropriate roles and responsibilities between our headquarters managers and the field sites, but we have appropriate oversight from headquarters. We are able to stimulate action to go ahead, but we are not in people's way.

UNCOSTED BALANCES

We have reduced the level of uncosted balances by a billion dollars over the past 2 years. I know this is of particular concern to the Congress.

However, I should note that uncosted obligations are not free money. They are not a slush fund that is just available there. There has been money obligated for specific projects.

Think of it as an analogy: If I wanted to make adjustments to my home, do new roofing, change my kitchen around, painting, electrical work, I will let a contract with a general contractor to do that. They would come in to schedule the work. I would obligate the money for them to do it. As they did their work, they would present their bills and be paid off. The obligations would be costed.

What happens, I think, with uncosted balances, the perception is that it is not money not obligated for things. We do ultimately have to pay those bills. If we use it for something else, no longer can you do the electrical work you had planned or the plumbing work you had planned. You have to realign it.

Clearly, though, uncosted balances must be managed well to encourage efficient operations, and we have been doing more of that. We have reported our uncosted balances to the staffs of congressional committees and GAO. Both have applauded our methodology and progress in reducing our uncosted balances by nearly 40 percent over the past 2 fiscal years.

We, in fact, have a number of guidelines and work with GAO regarding capital projects, operational activities, environmental restoration, and we are working hard to stay under those guidelines for cost and balances.

CONTRACT REFORM

Another area is contract reform. That has been vital to our progress. We are saving money, not spending it. The traditional single prime M&O contractor at DOE was cost plus award fee basis. This often was dictated by Cold War production imperatives.

As we looked at the cleanup activities, we could see that this was not as efficient as we wanted it to be and often would reward them to spend money as opposed to focusing on results.

We have recently changed a contract at Rocky Flats and seen a number of positive results in that. We have seen that those things that we tie performance to, we get good results on. We are now pursuing similar type of contract reform at many of our other sites.

One in particular is at Hanford and Savannah River. We will be pursuing those at every opportunity.

We have been trying, I think, to take a look at a number of other aspects—integrated information on risks, public health, worker safety; compliance, and reducing our mortgage. We want to make sure that first we deal with the public health risks, reduce the mortgages associated with maintaining the facilities for a long time, and ensure that we stay in full compliance with Federal and State laws throughout the land.

In doing so, we have instituted what we call "workout sessions", pulling together at each site senior managers from DOE headquarters, senior managers from the contractors on site, from the State, and the EPA. That has enabled us to assemble lots of information to look at where, in fact, we have either inefficiencies or where the State or EPA may be asking us to do cleanup that is inappropriate or in a way that is not the most cost efficient. Through a combined effort between us and them, we have been able to significantly reduce the cost and expedite the amount of cleanup activities going on.

The model for this perhaps is one we did at Hanford last year, and we are following that up at many of our sites.

WORK REALIGNMENT

In doing so, we are instituting programs to focus our attention on what I will call two aspects of how we do business. There are what I will call mission-direct works. Mission direct would be those things where people are actually out there cleaning up, stabilizing material, actually getting their hands dirty digging in those types of activity, or reducing risk in a building. The remainder of the type of activity on site we call support.

Our view is, as we move ahead, we want more and more of our dollars going into mission direct, the real work of getting the cleanup done—managing the waste, treating the waste, and disposing of the waste—and less and less work going into the support activity.

So we are working with each of our sites to take all kinds of activities that are done on the site either by Federal employees or by contractor employees, distributing them according to either mission direct or support activities, and looking at what needs to be done to improve the amount of resources and people working on mission direct and to reduce the number going into the support activities. That has been productive for us, I think, in helping to realign the direction we are going.

By benchmarking with some of the best companies in the world, we can see how they go about doing it and try to translate those types of approaches to our particular sites.

In conclusion, we are working hard to maximize our efficiency and cut costs, to realign work forces, to modify ourselves for multiyear, multi-billion-dollar contracts, and impose strong discipline on financial procedures.

We clearly recognize that as we are moving down the road we need to work at our sites and mine resources out of our sites; that is, mine the activities we have so that we can convert those dollars from support and other areas to more productive uses; and we are very committed to do that.

However, I would like to note that we believe that we are at what I would consider to be a stable level. Further reductions in our budget, I think, would be counterproductive for us being able to take advantage of the gains we have made. We need to get as much dividend from the changes that have been going on.

So as a consequence of that, we would request that you give us full funding for the requests we have this year, and we will work hard to effectively use your confidence and build on that confidence so that we can get a full degree of productivity from that.

Thank you for your consideration. I would be very happy to answer whatever questions you have.

[The prepared statement of Admiral Guimond appears at the end of the hearing record.]

Mr. KNOLLENBERG. Thank you, Admiral.

Dr. Dreyfus.

CIVILIAN RADIOACTIVE WASTE OVERVIEW

Mr. DREYFUS. I am accompanied by Lake Barrett, my deputy.

My written statement reviews in detail the progress we have made since I testified here last year, the work we will accomplish in the remainder of this fiscal year, and the work we propose to do with the funds we are requesting for fiscal year 1997. I will highlight the statement.

I am pleased to report that we have made a great deal of progress since my last appearance here. Almost all the increase in funding that we received in fiscal year 1995 was allocated to or utilized by the Yucca Mountain project. We have completed that year with accomplishments that often exceeded our targets.

At Yucca Mountain we have completed approximately one-half of the 5-mile exploratory tunnel and are now about 50 percent ahead of schedule. The tunnel is now well into the repository horizon and providing scientists with direct access to the site's geology.

To date, the tunneling and in-situ testing are confirming our expectations about the site. Thus far, we have found no geologic conditions that refute our important hypotheses that we will be relying upon for the safety of the repository.

We have also made substantial progress on technologies for waste, transportation, and storage. A contract for the design of the first multipurpose canister system was awarded in 1995.

As you know, the fiscal year 1996 appropriation did not fund the continuation of our previous program plan. It provided a total of $400 million for the program, of which $85 million has been reserved by Congress pending enactment of interim storage legislation.

Congress recognized that the 40 percent reduction in the level of funding in 1996 would require a more constrained repository program. In response, we have concentrated our efforts at Yucca Mountain on the most significant remaining issues. We have defined a set of tasks that will provide critical answers by 1998 to provide a solid evaluation for the viability of the repository.

We will also revise our approach to the licensing of the repository. Our objective is to focus on the safety considerations of a specific proposed concept. We believe that an application can be filed with the Nuclear Regulatory Commission in 2002 for a permit to construct a repository. That target will of course depend in part upon our success in updating the regulatory framework. That represents a $1 billion reduction in our previous expectations for the cost between now and the license application.

Our fiscal year 1996 funding situation required us to terminate our canister and cask development work. The work already done should prove useful to the private sector, and we will rely upon the marketplace to provide those technologies when transportation begins.

We have had to eliminate approximately a thousand contractor positions. We have also reduced the funding of our cooperative agreements to one-third of their fiscal year 1995 budgets.

CIVILIAN RADIOACTIVE WASTE BUDGET REQUEST

The administration's budget request for fiscal year 1997 provides a total program of $400 million, of which $200 million is to be derived from the Nuclear Waste Fund and $200 million from the Defense Nuclear Waste Disposal appropriation. The total amount is intended to be new discretionary appropriations.

We are not requesting the release of the $85 million that the Congress reserved for interim storage in 1996, and we are not depending upon any other legislation to provide the caps for the $400 million. It is all presumed to be new discretionary appropriations.

The revenue received by the program from collections from nuclear utilities in 1997 will be about $637 million. There will be about $320 million credited to the Nuclear Waste Fund as earned interest on the unappropriated balance from prior years' collections. The program's expected credits in 1997, therefore, will exceed the requested appropriation by over $750 million.

Of the $400 million request, 85 percent will go to the Yucca Mountain project. During the fiscal year, we will complete the 5-mile exploratory tunnel and the construction of all major underground test alcoves.

We will initiate heater tests in the repository rock to simulate the effects of heat generated by radioactive waste packages and study the structural and hydrologic response.

We will penetrate the Ghost Dance Fault, the major geologic feature of the mountain, first by drilling and then by tunneling. I expect the results of that work to answer major questions about water flow in the repository.

We will also advance the detailed design of all of the critical engineering features of the repository concept.

The $10 million that we are requesting for waste acceptance, storage, and transportation activities will continue to support our legal oversight responsibility concerning commercial spent fuel.

We will continue planning for transportation and interim storage.

We will examine a market-based approach to acquire transportation capability.

We envision procurements that would obtain needed shipping services from private vendors. They would then arrange to collect the fuel from power plants and deliver it to a Federal storage or disposal site.

We also intend to engage the Nuclear Regulatory Commission in prelicensing discussions on a non-site-specific basis concerning the technical procedural aspects of a phased interim storage facility.

Our $51 million request for program management is 12 percent of the total program budget. That is down from 16 percent in 1996, and it is down from 25 percent in 1993. This amount covers all of our Federal salaries and related work expenses and also covers the nuclear quality assurance efforts required by our regulators and our overall program planning, integration, human resources, and general business administration activities.

During fiscal year 1997, we will consolidate our support service contractors at a greatly reduced level of funding and improve our management systems to enable our Federal managers to function with reduced contractor support.

NUCLEAR WASTE POLICY ACT

I want to call your attention to our proposed language concerning the funding of the State of Nevada and units of local government. Consistent with this Committee's intention, in fiscal year 1996 we will not make payments under the provisions of section 116(c) of the Nuclear Waste Policy Act.

As we have informally advised your staff, we intend to fund some continued on-site testing and data gathering conducted by Nye County as general site characterization work. Continuity of this scientific work is important to the program, and the cost will be approximately $631,000.

I note, however, that section 116 of the act appears to place responsibility on this program to support appropriate levels of activity by the State and local governments for functions related to the program.

The support enables local governments and the citizens most directly impacted by the project to remain informed and to participate in a meaningful way in the day-to-day program actions that affect them. Financial support is particularly important for the rural counties in Nevada, where financial resources to support this kind of action is severely limited.

We would request the committee to give us statutory direction concerning the use of fiscal year 1997 appropriations for these activities. We have proposed to continue them.

With your approval of our fiscal year 1997 budget request, I am confident that the direction we are now taking will, by 1998, answer the important outstanding technical questions regarding the feasibility of the repository. With continued funding and an updated regulatory process, I am also confident that we can regain a target date of 2002 for submittal of a competent license application to the Commission. The level of funding we are requesting in 1997 is adequate to meet both of those objectives.

Thank you for your attention. I am prepared to answer questions.

[The prepared statement of Dr. Dreyfus appears at the end of the hearing record.]

EXPECTATIONS OF CLEANUP PROGRAM

Mr. KNOLLENBERG. Thank you, Dr. Dreyfus and Admiral Guimond.

Before we begin the question and answer dialogue, I would like to outline a few of my expectations personally for the Environmental Management Program which applies to the Environmental Management Program at DOE.

The EM program has been making improvements. You have been charged with a lot of responsibility in terms of improving the situation, maybe the most difficult task that we have faced in a century in some ways. Cleaning up the legacy of all the nuclear waste material in a safe, timely, and cost-efficient manner is not easy. I recognize the constraints. First, whatever we do, we must ensure that the health and safety of our workers, the public, and the environment are protected.

I can't emphasize enough that safety must always be integral in all our efforts. I trust, Admiral, that as a member of the U.S. Public Health Service, you have held a hat, if you still don't in that regard, that this is equally high on your list of priorities, and yet you report on EM's progress and performance in this area in your remarks this afternoon.

Second, we must ensure that our scarce resources—and I think you both referred to that—are employed in a manner that brings about a closure to this program sooner than later, hopefully in our lifetime.

Some of the studies predict they go into the year 2065. That is a long time into the future. My grandchildren haven't been born yet. So it will be they who may give witness to this. We need to define the expected sunset or end point for our facilities and focus on achieving those goals within current budget realities.

I at this time would like to turn to my colleague, Mr. Bevill, for any comments he would like to make.

INVENTORY OF NUCLEAR WASTE

Mr. BEVILL. Thank you, Mr. Chairman.

Admiral, you have obviously been making progress on the cleanup, and this of course is—as the chairman says, a very critical item for this country. None of us, I don't think, have really been pleased with the progress we have made, but it seems that in the past year you have really moved along on this.

I am curious to know, how much of an inventory do you have now as far as the high-level nuclear waste is concerned? Do you have such an inventory as to where it is located and the condition of each site in the country?

We had testimony about the mill tailings. I remember being in Durango, Colorado, southwest Colorado, and seeing the tailings there of the first atomic bomb that we built, and then the next time I was there it was gone, and that made me feel good, because we are always looking for a little progress somewhere but have been having trouble finding any. It looks like we are really moving out now.

MILL TAILINGS

Admiral GUIMOND. In another year we hope to make you fully pleased relative to the Mill Tailings Program because it is well along. There are very few of those piles left, and they will be wrapped up in a number of years.

Mr. BEVILL. Those are numbered.

Admiral GUIMOND. Those are from the tailings program, and a number of those, produced over 20-some different sites over the past decade or two, we have been working hard to clean up. We have progressed dramatically on most of those. We have a couple of remaining ones that we are working on right now but are well along on the program.

While we wrap that up, we are putting a lot of our attention to some of the urgent programs, such as dealing with high-level radioactive waste, in tanks in Savannah River, South Carolina; in Hanford, Washington; and in West Valley, New York; which we believe are urgent risks that we need to get on.

We are excited about the start of our defense waste processing facility in South Carolina. We are now able to turn that material out of tanks and into glass logs that will be able to be stored until we can put them into a permanent repository somewhere. Those are initiatives we see as innovative and continuing down the road.

We have an inventory of the various types of wastes that we have now. We are going to tick it off—we know how high the pile is. Let's keep ticking it off year after year so we can get it down.

Mr. Knollenberg referred to the BEMR report of last year that suggested a program that might take 50 or 75 years and cost $250 billion. We are not happy with that. It is our goal to significantly shorten that time frame and dramatically reduce the costs associated with it.

From my personal standpoint, we would like to see in the next decade a tremendous dent put into that, so that we have probably taken care of the bulk of the risk for a much less amount of money, so we can feel a sense of accomplishment in a reasonably short period of time as opposed to over four or five decades.

Mr. BEVILL. At the present rate, and considering your inventory and considering the status of each site, are you in any position to give an estimate of how long it would take at the present rate to clean up the high-level nuclear waste in the country?

CLEANUP TIME FRAME

Admiral GUIMOND. That which is in the tanks is a difficult problem. We have a request for proposals at Hanford, for example, to get a private vendor to come in and build a pilot plant. Hopefully by right after the turn of the century we will have that pilot plant going ahead and beginning to take material out of the tanks and processing it. It will take years for those tanks to be emptied and for all the processing to occur.

I can't give you a solid date of when the content of the tanks can be processed. Clearly, it will take a couple of decades for all that to be done. We are beginning to do it now in South Carolina and are looking in the next few years at getting a few hundred of these logs generated each year and using that as a way to reduce that inventory.

Mr. BEVILL. That is glassification?

Admiral GUIMOND. Correct.

YUCCA MOUNTAIN

Mr. BEVILL. All right.

Dr. Dreyfus, I know there at Yucca Mountain, that has been quite an undertaking. Do you have at this point any judgment as to whether it will be usable?

I realize that this is in an uncertain status at this time, but certainly you are making good progress. When I was there, you had gotten about 200 feet into the mountain, and now you are at about 5 miles.

Mr. DREYFUS. 3 miles.

Mr. BEVILL. 3 of the 5?

Mr. DREYFUS. Yes, sir.

Mr. BEVILL. That is good progress, and we are delighted to see that.

Do you have any opinion at this point as to whether it will be workable and will be usable? I realize there have to be reservations——

Mr. DREYFUS. Of course we have reservations, or we would be finished. I have a great deal more confidence than I did a year ago that we have a viable site. We have a great deal more confirmatory data.

We knew a lot about the mountain before, but most was imputed from a little bit of drilling and surface manifestations. We are now in the repository level. I sense a greater feeling of confidence from the scientists on the job that they have confirmed what they thought they knew, that they can predict what they will find, and what they have found is confirmatory rather than surprising.

I think we understand the mountain pretty well and can have pretty high confidence that it is a viable site. There remains a regulatory proof. That is what regulatory proofs always are.

We will this year be addressing the regulatory structure and trying to get better confidence when we know what will be expected of us in the regulatory structure.

I think there is a high probability that a repository can be designed and built at Yucca Mountain that will meet reasonable standards. My uncertainty has to do with decisions that have to be made in a regulatory process that will be adversarial by its nature. I was not in that mood a year ago. There were a lot of dark spots a year ago because they were not filled in. We will finish filling them in by 1998. By that time, we will have a solid notion of what we intend to design and our ability to build it.

Mr. BEVILL. In your judgment, how long would it take to complete the 5 miles?

Mr. DREYFUS. This minute in 1996, I am in deep trouble financially because I am absorbing a 40-percent cut. I have cut about everything in the program I can cut to keep that machine and the scientists that work with it running.

If I can keep the machine running through the rest of this fiscal year, I will be out of the mountain early next fiscal year, at the end of this calendar year or in the spring, depending on ground conditions.

If I run out of funding, I may be stopping it shy of October for a while in order to wait for money. But if I can manage the funding, we will complete the 5-mile loop early next fiscal year, around the end of the year.

Mr. BEVILL. Somewhere I got the impression that perhaps by 1998, of course assuming you get adequate funding to keep it going, that you would be in a position then to make a determination as to the permanent use or temporary use, whichever, of the Yucca Mountain site.

YUCCA MOUNTAIN SUITABILITY

Mr. DREYFUS. The administration has proposed that there not be a decision made on interim storage until we have the information, until we have some assurances that we have a viable site.

In the communications to the Senate most recently, again, the administration restated its view that we would have that information by 1998.

I think we will have sound information by 1998 with regard to whether the Yucca Mountain Site has a high probability of going forward. The administration's position is that a decision about temporary storage should rest on that.

Mr. BEVILL. Thank you, Mr. Chairman.

Mr. KNOLLENBERG. Thank you very much.

I want to, Admiral, have a question or two with you about numbers, about personnel. I appreciate your graph. I just draw attention to a couple things.

One is, I appreciate where the lines are going, but in terms of cleanup, I think I heard you use a term called "mission direct." I assume that applies to people that are hands on with respect to the cleaning, pretty much?

ENVIRONMENTAL MANAGEMENT PERSONNEL

Admiral GUIMOND. Yes, depending on what the program is. If it is restoration work, it would be hands on relative to actual cleaning up activities. If it was waste management, people would be actively involved in dealing with the tanks or the vitrification equipment that is solidifying the wastes.

Mission direct activities are directly related to getting the job done.

Mr. KNOLLENBERG. Around our office, it is difficult to talk about some of the categories that you might speak to, but if I were to divide them up—and we have—into what we call space suits, the people that tend to work hands-on, have the protective gear and all—another is lab coats, those focused internally that are not outside; they may be laboratories technicians; and finally, the business suits, the administrators, the folks that tend to direct.

If I were to divide it into those three categories—and let's try and do that—even though there have been significant cuts, and you state there have been; I follow some; I know also the history of this whole energy, the waste management situation. When production went down in 1989 or early 1990, the numbers swelled significantly, and not just at a couple of places but pretty much all over.

The hint is that perhaps the people there doing the production were held on while they brought in new people to do the cleanup and that created a bell-type curve in terms of employees. I see they are coming down.

In terms of the general mix, we are talking about space suits, the lab coats and the business suits. Could you give me a picture of the mix of employees within the entire personnel?

Admiral GUIMOND. It is going to be variable from one site to another. We have been looking at that specifically and trying to get an idea because if I relate your description, the three breakdowns you used, to the description I used of the two breakdowns, your space suits would equate to my mission direct. Your lab coats, some would be in my mission direct and some in my support category, and your business suits would be in my support category.

If I take a look at the individual sites that I have, clearly the percentages vary significantly, depending upon the history of the sites, how much growth they had, or how quickly they were getting out of the production arena.

What we are trying to do—because I agree, I want more people in the space suits, as you describe it, so that those dollars can be getting on with this much more rapidly. So for us to do that, we are going out to each of the particular sites to review exactly how people are doing—the people that are in the business suits, the people that are in the lab—what precisely are they doing and do we need to have them do it? Let's try to get less of that done.

In some cases we find out they are doing it because DOE may have an order requiring certain analysis to be done. EPA or a State may have requirements there.

We can't just cut those people out. We have to negotiate or get rid of the DOE order or deal with other elements. That helps us figure out what we need to do to cut them down.

As we take a look at the resources available at the individual sites, our direction to our site managers is, as we reduce the employees at the site, to ensure that more people in the support category are coming off and that we are leaving more of the people in the mission direct category.

I can't totally make it that way because in some cases the way we get the site down is through voluntary retirements. In some cases, you will have people that might have been in the space suits that want to leave.

But we want to ensure we have people in the support category going down and people in mission direct, less of them leaving, more of those people staying. And so as we then take a look at further work—that is, subcontracting things out, new contracting schemes, fixed price contracts for doing some of this restoration or cleanup work—that way we have more cash available to do the mission direct kind of work.

The direction you want to go is 150 percent where we want to go.

Mr. KNOLLENBERG. This graph tends to reflect improvement numbers?

ACCOMPLISHING MISSION

Admiral GUIMOND. Absolutely.

We are not as far along as we want to be, I will be candid. I see myself as the junkyard dog policing this thing and making sure it goes as quickly as possible.

As we do these workout sessions, and every time I review a site, one of the things we are doing now are, take a look at the best companies; what is the ratio of dollars they put into mission direct versus support.

Some of the best companies in the country have, like, $2.00 spent for mission direct for every dollar spent on support activities. I think that is a good goal for us.

I don't know of any government agencies that are quite that good because of inherent problems associated with government, but certainly we want to work in that direction as rapidly as we can. It will take us a while to get there because some are more one to one now, but that is our goal on directional working.

Mr. KNOLLENBERG. In connection with that, I don't know if that 2-to-1 ratio is magic.

Admiral GUIMOND. I don't know if it is. Some say it should vary from site to site. I want to take a look at what the best companies are doing and move in that direction.

Mr. KNOLLENBERG. We have had a difficult time getting numbers from DOE as to particular locations, and we have inquired. There is a foot dragging in terms of response time. They may not know, but the companies you are checking with, the ones in the private sector, they will know in a minute where they are, who they are, how many they are.

That comes to my next question. This bothers me a bit. It is not directed at you so much, but I would like your response.

We had difficulty understanding last week when Undersecretary Grumbly made revelations about numbers of employees at Rocky Flats. We have watched that pretty closely over the last several years, done studies ourselves internally to get a look at just how many employees were there. I believe it was below 5,000 in 1989; it rose to 7,500. It is backing off now.

But in trying to get a number—and he said in testimony that he thought it was down to 4,000. Then he corrected himself and said on Friday it would be below 4,000

We called Friday; we got a number; it was 4,900; and they had it further categorized in this fashion. They had 300 as Federal employees; contractor employees of 4,457; then Federal support contractor employees of 200, which tends to be, I presume, secretaries and what-have-you. But the number is greatly different.

Every time you look at those employee numbers, you say it isn't just salaries, it is fringe benefits, it all adds up. We would like to get to a number. We would like to know what is the accurate number.

ROCKY FLATS EMPLOYMENT

Admiral GUIMOND. That is fair.

Part of the issue that may be difficult is determining what people are included. I think probably when the Secretary talked to you he was referring to the people with the prime contractor, ICM Kaiser Hill, which is the 4,400 number that you gave. This year we have plans to reduce those by about 950, which will take that to the 3,500 range.

Mr. Knollenberg. By when?

Admiral Guimond. I will have to get you the exact date.

Mr. Knollenberg. I would like that.

[The information follows:]

Employment Information

The following chart provides the staffing levels at Rocky Flats as of March 16, 1996:

	Kaiser-Hill	Subcontractors	Total
EM Federal			304
EM Contractor	2,346	1,591	3,937
Subtotal EM	2,346	1,591	4,241
DP Contractor	473	80	473
DOE subcontractors			241
DOE non-payroll			2
Total, Rocky Flats	2,426	1,984	4,957

Mr. Grumbly correctly indicated that the total number of cleanup (i.e., Environmental Management) contractor employees at the site was under 4,000; and the site was correct when it provided a figure of 4,957 for the total number of workers, including contractor and federal workers involved in Environmental Management (EM), Defense Programs (DP), and general support activities.

In March 1996, Kaiser Hill requested and was given authority to reduce its present workforce by up to 500 FTEs, in addition to the remaining authority from FY 1995 to reduce 450 FTEs, for a total possible reduction of 950 FTEs. Currently, the site has projected a total site reduction of 565 contractor positions through FY 1997 with additional reductions dependent on the FY 1997 funding level. Some of these employees may move to lower tier subcontractors when their positions are eliminated at Kaiser Hill and remain in the site workforce. Hence, there is not necessarily a clean reduction in staff from the 3,937 EM contractor FTEs in FY 1996 to 3,372 in FY 1997.

Admiral Guimond. Before I came here, I spoke with the manager of Rocky Flats, and he had indicated to me that the 4,400-odd number that you gave is what is employed by ICM Kaiser Hill. They have on the order of 300 Federal employees and employees with support service contracts. Employees come and go. That is why that probably would not have been tracked by Under Secretary Grumbly, because those come and go.

Mr. Knollenberg. We would like to have that so the discrepancy can be corrected. It doesn't add up. We have had a hard time getting those numbers, and for us to do any kind of study of need and assessment—I do like what I see on the graph, but that also has to tie in with those numbers that we are getting from those various sites.

I think I asked the question of what the ratio to lab coats, as I call them, or space suits and business suits, and it varies by location, but it would seem to me that is information we could get as well by site perhaps?

EMPLOYMENT BY SITE

Admiral Guimond. We can give you the information as it is right now by site. Some site information will be more developed than others.

[The information follows:]

EMPLOYMENT INFORMATION

The attached spreadsheet entitled "Environmental Management Contractor and Federal FTE's" includes the requested ratios for the five largest EM sites. The numbers for all remaining sites have been requested and a complex-wide table will be prepared by April 30.

Environmental Management Contractor and Federal FTEs

	Federal				Contractor 5/				Total			
Site	Direct 1/ Clean-up	Direct 2/ Support	General 3/ Support	Total	Direct Clean-up	Direct Support	General Support	Total	Direct Clean-up	Direct Support	General Support	Total
Idaho												
FY 95 Ratios	0%	80%	20%		35%	45%	20%					
On Board As Of 3/16/96	0	222	54	276	858	1,104	491	2,453	858	1,326	545	2,729
	0%	80%	20%		35%	45%	20%		31%	49%	20%	
FY 96 SAI Target (Federal)	0	211	53	264								
Target Distribution	0%	80%	20%									
FY 97 SAI Target (Federal)		196	52	248	729	938	417	2,084	729	1,134	469	2,332
Target Distribution	0%	79%	21%		35%	45%	20%		31%	49%	20%	
Oak Ridge												
FY95 Ratios	0%	0%	100%		40%	35%	25%					
On Board As Of 3/16/96	0	0	170	170	6,775	1,309	2,014	10,098	6,775	1,309	2,184	10,268
	0%	0%	100%		67%	13%	20%		66%	13%	21%	
FY 96 SAI Target (Federal)			163	163								
Target Distribution	0%	0%	100%									
FY 97 SAI Target (Federal)			145	145	5,689	1,116	1,659	8,464	5,689	1,116	1,804	8,609
Target Distribution	0%	0%	100%		67%	13%	20%		66%	13%	21%	
Richland												
FY95 Ratios	0%	0%	100%		40%	38%	22%					
On Board As Of 3/16/96	0	274	263	537	4,607	3,898	2,219	10,724	4,607	4,172	2,482	11,261
	0%	51%	49%		43%	36%	21%		41%	37%	22%	
FY 96 SAI Target (Federal)	0	268	256	524								
Target Distribution	0%	51%	49%									
FY 97 SAI Target (Federal)	0	261	248	509	4,607	3,911	2 234	10,752	4,607	4,172	2,482	11,261
Target Distribution	0%	51%	49%		43%	36%	21%		41%	37%	22%	

Richland Federal And Contractor numbers and mix is subject to fluctuation dependent on the final outcome of privatization and several other factors presently under review

Environmental Management Contractor and Federal FTEs

Site	Federal				Contractor 5/				Total			
	Direct 1/ Clean-up	Direct 2/ Support	General 3/ Support	Total	Direct Clean-up	Direct Support	General Support	Total	Direct Clean-up	Direct Support	General Support	Total
Rocky Flats												
FY95 Ratios	0%	0%	100%		40%	38%	22%					
On Board As Of 3/16/96	0	24	280	304	985	1,643	1,309	3,937	985	1,667	1,589	4,241
	0%	8%	92%		25%	42%	33%		23%	39%	37%	
FY 96 SAI Target (Federal)	0	24	270	294								
Target Distribution	0%	8%	92%									
FY 97 SAI Target (Federal)	0	20	265	285	830	1,310	1,232	3,372	830	1,330	1,497	3,657
Target Distribution	0%	7%	93%		25%	39%	37%		23%	36%	41%	
Savannah River												
FY95 Ratios	0%	0%	100%		60%	29%	11%					
On Board As Of 3/16/96	0	0	570	570	8,196	3,982	1,431	13,609	8,196	3,982	2,001	14,179
	0%	0%	100%		60%	29%	11%		58%	28%	14%	
FY 96 SAI Target (Federal)	0	0	549	549								
Target Distribution	0%	0%	100%									
FY 97 SAI Target (Federal)	0	0	495	495	8,144	3,426	1,316	12,8[illegible]6	8,144	3,426	1,811	13,381
Target Distribution	0%	0%	100%		63%	27%	10%		61%	26%	14%	

1/ This represents the "Space Suits"
2/ This represents the "Lab Coats"
3/ This represents the "Business Suits"
4/ In FY95 Savannah River was a dual purpose site (Defense Programs and Environmental Management) It is all Environmental Management in FY 96
This accounts for the significant increase in FTEs chargeable to EM
5/ Contractor employment is generally expected to remain at the same level as the 3/16/96 on board strength for the remainder of FY 96

Admiral GUIMOND. A point that you made earlier was, you have had difficulty getting that information. It has been difficult for us internally to get this information. The reason is, for many years the Department enabled these on-site contractors to keep their books in a way that was comfortable for them. As a consequence, if you had a certain way you wanted to array something, it was very difficult to get comparable data. It was very difficult to be able to put this together.

When we started pushing back to try to figure out exactly where it was so that I could push in the direction of more space suits, and less business suits, I had to get some kind of accounting that was standardized.

So we have been working with the CFO in the Department as a whole, with the CFOs at the various sites, and with their companies to get a standardized racking, if you will, of all the types of activities that go on, so we could break them up into mission direct versus support, so we could understand how many were doing this. When we had those numbers we could see if we were in good shape or not so good shape and where we could work to improve things.

It has taken us the course of the past year to work to get that standardization done. The standardization is being rolled out throughout the Department on a pilot basis and over the course of next year will be more universal. We will be able to get you some reporting back that looks standardized.

Within a year from now, we will have excellent information and be able to make improvements—you are right on point—from the standpoint of the same direction as we are going, because we see in a gross sense, by being able to make shifts in those ratios, although I can't give you a magic number what the ratio is, continuing to push the ratio harder, by looking to the best companies in the private sector to guide us, we will be moving in the right direction.

Mr. KNOLLENBERG. There have been articles in the newspapers of late about reductions in employees at various sites. In Savannah there is a figure I have heard of 1,930. That may be over a period of time.

I would like your comments on Savannah and the site at Rocky Flats in terms of reductions.

EMPLOYMENT REDUCTIONS

Admiral GUIMOND. You are interested in the number of people going down at each of the sites?

EMPLOYMENT LEVELS

Mr. KNOLLENBERG. Yes. My information tells me that Savannah is like 1,900, but it is over a period of time and there is some doubt about the accuracy of that number.

Admiral GUIMOND. Savannah River has been reduced in the past several years, and Hanford. All have come down significantly. In some cases some of the sites, because of the 1996 budget, have to come down more than others right now, and we are looking to figure out what is the right amount.

Savannah River has made an announcement in the neighborhood of the numbers you have indicated. Hanford, for example, right now is looking at how much it is going to reduce to deal with that. Some of those numbers are in a bit of flux now. We are looking at what we can accommodate in 1996 down the road.

[The information follows:]

EMPLOYMENT INFORMATION

The employment level at the Savannah River Site, and to some extent other defense mission sites such as Rocky Flats, increased to address the restart attempts for nuclear weapons facilities as well as the emerging environmental management missions. At the Savannah River Site, the production of nuclear weapons materials (e.g., plutonium, tritium) ceased in August 1988 with the shutdown of the last nuclear reactor for health and safety reasons.

Employment increased from approximately 16,500 in 1989 when the last reactor was shutdown, to more than 21,000 in 1992. This increase reflected staffing to attempt to restart the K-reactor, which restarted briefly in late 1991, and to support design work for the New Production Reactor. At the same time significant additional staffing was also added to the preexisting nuclear weapons material production staff to deal with environmental management missions, such as construction of the Defense Waste Processing Facility and environmental restoration requirements.

At Rocky Flats, a similar "layering" of environmental engineers, scientists and other expertise was being added on top of the nuclear weapons production staff, which was being supplemented to restart plutonium pit component fabrication for warheads, needed for the D5 Trident ballistic nuclear submarine missile.

Mr. KNOLLENBERG. Members of Congress represent all of these areas, and they have concern about losing employees, but obviously the main concern should be, are they necessary? Do we need them? Three hundred and seventy-five at Idaho, as I remember, is another number, and that has people concerned what it will do—mayors of local cities.

The same thing is true of Savannah. Savannah doubled from 1989 to 1993. Now it is backing off.

The question I am raising, and I am not charging you with being on watch when this occurred, but that is a hellish increase in a very short period of time. As you can see, if you were to graphically show that, I could do some things to your blue line that the green line would go off the chart in terms of total numbers.

So yes, it has to come down. The question might be, why did it go up in the first place? That is another question for another day. On your watch, you are bringing it down. I would like your comment on what is the reason for it swelling to that total.

SAVANNAH RIVER INCREASES

Admiral GUIMOND. The reasons are slightly different at various sites. If you take Savannah River, it in the early 1980s was on a growth path for putting three new production reactors in place.

Because of technical difficulties they had in bringing that in, thousands of people, engineers and scientists, were brought in to look at those. So there was a tremendous amount of growth there associated with those new production facilities.

If you take a look——

Mr. KNOLLENBERG. They have never produced tritium yet though, have they?

Admiral GUIMOND. No, and they are not going to. They decided to not pursue production. There was a turnaround. Some of those people were put into the environmental management program, and we have been looking at how many do we need to do the various jobs available to us and what is the streamlining to do it.

If you take a look at Hanford, Rocky Flats, for example, when the environmental management mission began in earnest in the late 1980s there was a tremendous amount of pressure from EPA and the States to get lots of things started, lots of studies going, restoration projects under way to meet regulatory milestones or other types of commitments.

Since some of the people on the site did not have all the necessary capabilities or expertise, additional staff was brought in, and some of the growth and swelling occurred because of that.

We are now taking a hard look across all this complex, making each of our managers and site people take a look at what is the workload that we need to do, trying to get our unit costs down, trying to get ourselves very commensurate with the costs in the private sector or other Federal agencies.

One of the tools we have to try to do this is benchmarking, figuring out how much it costs a private company to do this type of a cleanup or that type of study or that type of management, and then using that as a way for us to figure do we need 5 or 10 people in that arena. If we only need five, that is five excess, and they need to go eventually.

Mr. KNOLLENBERG. I want to turn over to my colleagues, but I do think that skill mix is maybe the most important thing.

One of the problems we have as Members of Congress is to find the information. It occurs to me that you have the same problem. Before you can actually begin to look at your problem, you have to have some understanding of the numbers, what they do, and if they are doing the right thing. If that isn't in place now, it should be.

I don't think there is a successful company in the private sector that doesn't know instantly or, if there is not a lieutenant on site, will get one to tell them where they have to go to get the information in a hurry.

You are saying that you are getting there but you don't have the information available to make a judgment.

SKILL MIXES

Admiral GUIMOND. You are right. If 5 years ago when the program got started they would have been able to have all the administrative tools in place to categorize people right, to track unit costs, and to do all those kinds of things, you would have been able to get this thing done probably from day one.

For a variety of reasons, that was not where the initial priorities were. The pressures from both the communities around the sites as well as the Federal regulators were to get more activities started in the restoration arena. Right now we are looking at that.

As I would ask questions like you are now: How do we know this is the right amount, the right skill mix? I go back to the underlying data. In many cases it is not there, the systems weren't there.

Unfortunately, we have to build systems that weren't there. Unfortunately, we have had to put consistent projects in place collecting the data and analyzing across places.

That is one of the key things as we look at the jobs of the headquarters folks as opposed to field folks. We want the field folks to focus on the cleanup, on the on-the-ground improvement, and use our headquarters folks from the standpoint of the benchmark, comparing site A to site B, to do the trend analysis so we know where we need to push harder, where we are getting results.

Mr. KNOLLENBERG. The end point has to be something that you can telescope and see, too.

Admiral GUIMOND. I agree.

Mr. KNOLLENBERG. If you can't, then you are wandering in the yard.

Admiral GUIMOND. I would like to see an endpoint commensurate with the analogy that President Kennedy had. His vision was, within 10 years we would get a man on the moon and bring him back. I would like to see something similar for our program. In 10 years we will have 80 percent of the problem taken care of for very little money.

Mr. KNOLLENBERG. That is a classic example, and I might have used that myself. That seems to be something that has to be——

Admiral GUIMOND. Absolutely. It has to be a centerpiece vision, because that way I can motivate my staff, the field staff, and contractors. It is difficult to motivate somebody 60 years down the road. That is not my kids, not even their kids' kids working at that.

Mr. KNOLLENBERG. I appreciate your comments and responses. I am going to turn this over to the proper gentleman, the chairman of this committee, John Myers.

Mr. BEVILL. Could I have your attention for a minute here?

Before we had this hearing date set, I had about seven different groups I am going to be meeting with between now and midnight, so I am going to submit my questions for Dr. Dreyfus and also for the Admiral.

I will have to read this testimony, because I am going to need to leave. So I will just submit the questions for each of them to be answered.

Mr. MYERS [presiding]. Without objection.

Mr. BEVILL. I would like to commend both of you for your accomplishments and the progress you have made in the past year.

COSTS AND BENEFITS OF CLEANUP PROGRAM

Mr. MYERS. Thank you very much.

Gentlemen, please excuse my getting here late. When we have to fly, we can't always meet every schedule. It isn't the importance of your mission, because I know of no witnesses we will have before this committee more important than the job you have been given, both for the environment as well as waste management. Sometimes this committee has been critical, and thanks for Joe and Tom and the staff for covering for me.

But this committee has felt—and I speak for most members of the committee—that possibly we have been more concerned about the environment than we have about really the waste management. They are related, of course. But we have a great many people who have testified before our committee and others who have made statements that possibly we have spent more effort in cleaning up the environment than we have about addressing the fact that we have waste out there that we have a legal responsibility to do something about.

I think of the expenditures we had made in the past, we had a very poor return on the environmental side as far as the cleanup. If we applied the benefit-cost procedure that we have on other programs that this committee has to address, you would have been out of business a long time ago. We have talked about that several times. For the money we have spent, we have very little to show for it. We have to do something about it, and I think you are heading in that direction.

Perhaps I will repeat questions. If so, cut me off. I am concerned about that.

YUCCA MOUNTAIN

Dr. Dreyfus, I think you are a lot more positive this year about the future of the Yucca Mountain. That may not be what some people at the bottom would like to hear, and some of the "anti" people, who would like to turn the hands of the clock back and have it all go away, send it to the moon. But you were a lot more positive, and I am glad to hear that.

I have not been there for 3 years. I will have to go there this summer and look at it. I think you were just a couple hundred feet in the mountain. You hadn't even started the big machine. It was on site.

Mr. DREYFUS. It was being assembled.

Mr. MYERS. We are pleased that you are 2 and a half miles into the mountain.

Mr. DREYFUS. We are about halfway through the 5-mile tunnel but well into the repository formation. We are building one major alcove in the repository formation. We are past the portal to another, so we will be putting the heater tests in and actually penetrating the major fault system within the next few months.

Mr. MYERS. If you had found something, water or structure in the rocks, that would be not suitable for a repository, would you have stopped, put the red flag up?

Mr. DREYFUS. It is difficult to know what would happen. Basically, we are trying to confirm hypotheses. If we blow a hypothesis that is central to our waste isolation case, we have to stop and tell people what happened and determine whether this is something you could plan around or whether you are in fact out of business.

We haven't found anything like that. We haven't even found anything that is a problem for a hypothesis. We have been confirming hypotheses. So we don't have a situation like that.

Mr. MYERS. This committee has been burned so many times on so many different things. In the enrichment process we built a big plant in Ohio and decided that wasn't the way we wanted to go. The fast breeder reactor; many times we have been burned. If you knew something now, you would tell us?

Mr. DREYFUS. Not only that, but the fact of the matter is that, as a matter of management and necessity, we have focused the work at Yucca Mountain on those things that have the potential for surprise. We are working hardest at the items that have significant incomplete questions. We will finish them all under this program by 1998.

These are design questions. We have to complete the designs, cost them out, assure ourselves that technologies exist that will do what we want to do and that they are within the realm of financial capability. That work is the central thrust of the program now, and that will be finished in the next two budget cycles.

Mr. MYERS. You started an alcove. That is a branch off to the side.

Mr. DREYFUS. We have a number of alcoves in the tunnel.

Mr. MYERS. Already built in?

Mr. DREYFUS. Yes. There are two that are operating and taking data, but the principal one, the biggest construction job, is a heater alcove which is just after the first turn in the repository. If you want to take the time, we have a diagram. That heater alcove is a couple hundred feet of excavation, a fairly complex installation of sensors, and then we will put in——

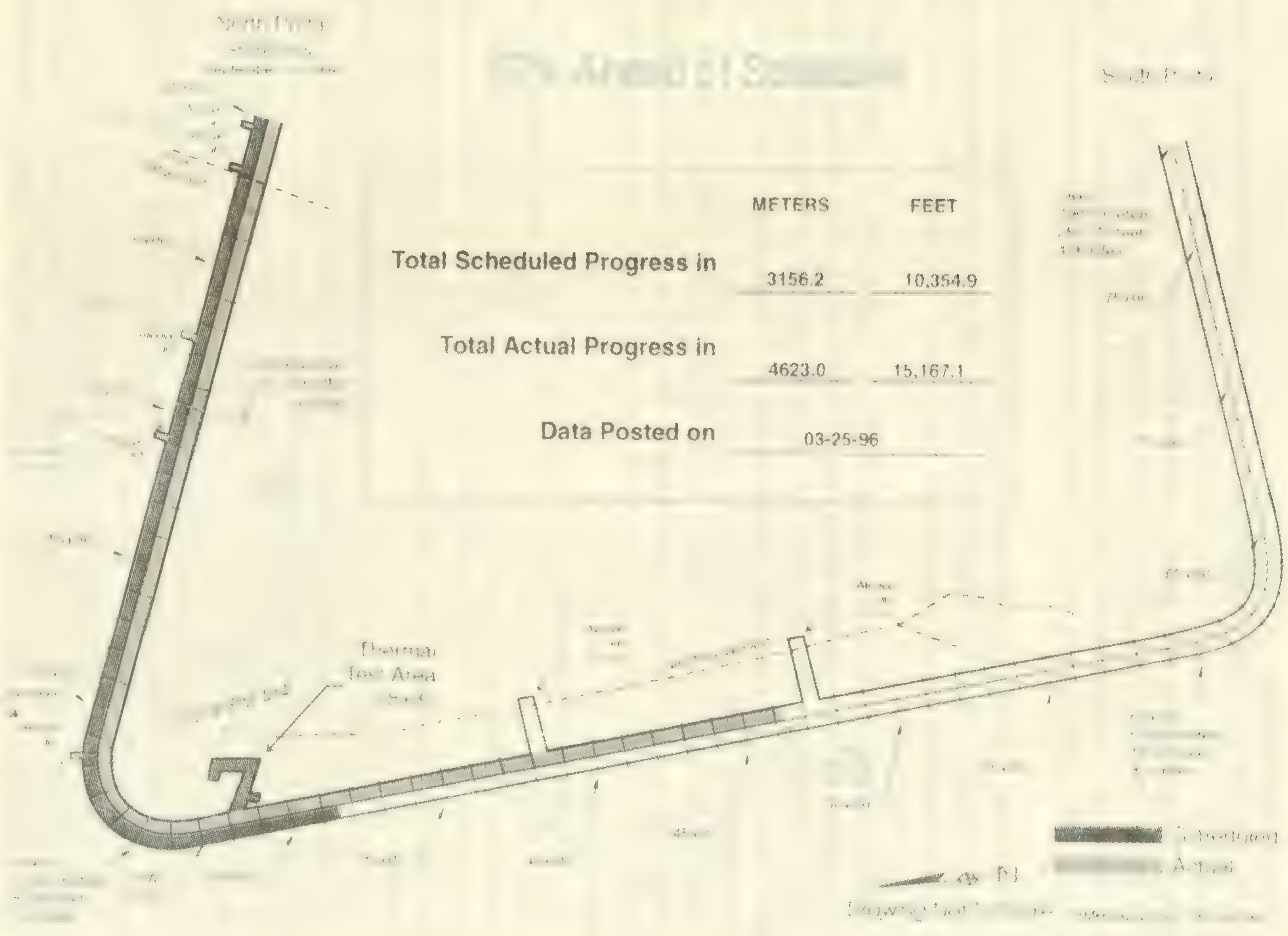
Mr. MYERS. You made a——

YUCCA MOUNTAIN'S SCHEDULE

Mr. DREYFUS. That is basically the tunnel, the 5-mile tunnel loop. The blue line is where the tunnel machine is now. The green line is the schedule that we were on for today. We are 47 percent ahead of schedule. We were behind schedule——

[The chart follows:]

TUNNEL BORING MACHINE PROGRESS



	METERS	FEET
Total Scheduled Progress in	3156.2	10,354.9
Total Actual Progress in	4623.0	15,167.1

Data Posted on 03-25-96

Mr. MYERS. You did that with less money too. That is good news for this committee.

Mr. DREYFUS. I wouldn't want to do it with less money unless we absolutely had to. I will explain to you some of the things we haven't done with the money we haven't got.

In any event, that alcove that you see just after the first turn is the thermal test area. It will simulate the heat of a waste package so we can measure the structural and hydrologic response in the rock.

Then we have two alcoves beyond that will penetrate the Ghost Dance Fault. The Ghost Dance Fault is a major geologic feature. It will answer questions about potential for fast flow of moisture in the mountain.

Mr. MYERS. You have made vertical tests all the way around, so you know pretty much the type of rock you are going to get into?

Mr. DREYFUS. We know a lot. If you have a vertical fault and you drill vertically, you don't see much. When you go through horizontally, you find out a lot.

Right at that turn, is the Drill Hole Wash Fault. From surface trenching and drilling there was a lot of controversy over what that would be. When we got down there, we could barely find it in the tunnel.

Mr. MYERS. No water.

Mr. DREYFUS. No, no fault that is of any consequence now. On the other hand, we found conditions in the early part of the tunnel that were more blocky and difficult to deal with than we expected. We had drilling, but the drilling is a pretty thin snapshot of what is down there.

So the tunnel has been instrumental in building confidence in the scientific community that they knew what they would find and understand what they see in the drilling.

I think the last year has been a major step in building confidence, which is the reason I feel more positive that we won't find a surprise in a natural setting than I did a year ago.

Mr. MYERS. The thermal test area, how long have you been in that area?

Mr. DREYFUS. We are just excavating it now.

Mr. MYERS. How long will it take to do the tests on the thermal?

Mr. DREYFUS. There are two tests. We will start a small-scale test at the end of this year, and the large, full-scale test that simulates a full waste package, and the adjacent ones, we will be turning on during 1997.

Mr. MYERS. All the important stuff you are going to do after Mr. Bevill and I leave the committee, aren't you?

Mr. DREYFUS. We will keep in touch.

Mr. MYERS. You would rather not have to.

In our 1996 appropriation, we are sorry we had to cut it, but you weren't the only ones we had to cut last year. I don't know anything more important to the future of the nuclear program than what you are doing.

CIVILIAN RADIOACTIVE WASTE PROGRAM

Mr. DREYFUS. The program we are offering this year is, I think, the least cost program that will maintain a schedule to get final actions in the next few years.

Mr. MYERS. We appropriated $400 million, $85 million of which was to go to consideration of an interim storage site. Of the $315 million, how much was allocated to drilling that hole?

Mr. DREYFUS. Of the $315 million, I allocated $250 million to Yucca Mountain.

I have had very large termination costs this year. I am reducing contractor staff by about a third. I have had to terminate the canister program. So a lot of the 1996 money is tied up, basically in winding up affairs.

But I put $250 million into Yucca Mountain. I protected the tunnel and the science that is directly related to the tunnel. We have to do the mapping and emplace the sensors and do the science that goes with it, and that has been our highest priority.

We have essentially cut everything else we could cut to maintain progress of the tunnel boring machine. I hope I can run it throughout this fiscal year and on into October without stopping it, but it is a major cost.

Mr. MYERS. How much would operating that machine run for the fiscal year, actually doing the digging? Supply that for the record.

[The information follows:]

OPERATING COSTS FOR TUNNEL BORING MACHINE

The tunnel boring machine (TBM) is the main piece of equipment constructing the Exploratory Studies Facility (ESF) which is now well into the proposed repository horizon, and is providing direct access to major geologic features of the site. The actual cost to operate the TBM averages over $7 million per month. The cost of operating the machine itself, however, is a fraction of the costs associated with the ESF. For example, as the TBM completes excavation of a section of the tunnel, direct scientific observations of surrounding rock and continuous mapping occurs. The cost of these scientific data gathering activities average an additional $1 million per month. Numerous scientific tests are also conducted in the ESF, such as, the heater block test to be conducted in one of the alcoves constructed using the apine miner. Data from the direct observations, mapping and testing must then be analyzed and fed back into subsurface and waste package designs and performance assessment models. The knowledge gained from our scientific activities is important in the iterative process of developing the designs and ensuring that the total system performance assessment models will accurately predict repository performance. In addition to the construction, operations and scientific activities, we must also maintain a Quality Assurance program to support those activities, as well as safety and health programs to protect the workers. In FY 1996, the total ESF costs attributable to operation of the TBM, the collection and utilization of the scientific data it yields and other directly related costs, is approximately $130 million.

Mr. MYERS. We have a lot of people out there doing nothing except standing around looking over your shoulder. I have been there twice and am shocked to see how many people are not really contributing toward making that hole a success. They may be doing something, I don't know. They are sitting in a trailer someplace. They are not your people, they are regulatory commission people you have to bring on board to satisfy ambition or inquiry. We have tried to eliminate part of those people.

Have we been successful in getting those people off your backs?

REGULATORY PROGRESS

Mr. DREYFUS. I think that this year, one of the things we will do is propose, along with this budget, a reduced amount of work to be done between now and license application. We think that we are 10 years, at least, smarter about how to do this job now, and if the regulatory community can, in fact, find it in their hearts to cooperate in that venture, I think we will have solved one of the major problems. Basically we did anything that came along that could be related to the program, because we were not that good at knowing where we were going, so we couldn't differentiate between what was important and what was not. It was a heavily overseen program with a high public interest in not making a mistake.

So I think we are making progress on the regulatory side of this program as well to rationalize what we are doing trimming it down to what affects the safety of the proposal. We have trimmed a lot of work out that formerly was thought to be required, but I don't think is anymore.

CANISTER PROGRAM

Mr. MYERS. You mentioned the canister program. Do we have people in other countries looking at what you are doing there? We know that other countries have developed canister programs. Are we looking at those programs? Can we use other people's research and technology?

Mr. DREYFUS. We have international cooperative programs. They are going to be a great deal smaller than they were before, too, but we have them.

We have a canister vendor community within the United States, and it is an aggressive community and will develop canister technologies.

The philosophy of the multipurpose canister was that it had a payoff for the full system from the reactor pool to disposal to the waste package. It did not necessarily have the payoff at a specific reactor site for the short term. We felt that it was appropriate for the Federal Government to bring that technology along, because it wasn't economically advantageous to a particular utility making a particular decision for a small amount of storage.

We have terminated the program. We will make the results of the program thus far available to the community of vendors. I think they are going to go forward with advance technologies, and our expectation, consistent with bills that are in the Congress today, would be to use the marketplace to acquire the necessary canisters.

Mr. MYERS. I would think they would be doing it now. There are other nations who have already developed canisters.

Mr. DREYFUS. There are canister technologies in the United States that are probably as advanced as those in other countries. It is just that they are not the next generation, the next generation that will come along in the marketplace as long as we give the right signals that we intend to utilize the services.

We are the only shipper of 3,000 tons a year, and betting venture capital on when we do it is not something that is attractive at the moment. We are trying to make it attractive as we go forward.

Mr. MYERS. I think we have to do something about that.

One more question. I mentioned about the cooperation. We do have other countries who are concerned and interested about proper storing. No one has made the final decision, to my knowledge, about repository or permanent storage. Has anyone made that decision yet?

GEOLOGICAL STORAGE

Mr. DREYFUS. Almost every nuclear country has as a strategy that it will use geologic storage of the ultimate high-level waste, some with reprocessing, some without. They all expect to use a geologic repository.

As far as I know, the only one other than ourselves that has chosen a site is Germany, and it has much the same situation we have. The others are all doing experimental programs with actual site selection somewhere down the road. It tends to give you the appearance of political ease, if you haven't picked the site.

The Canadian program, for example, has an underground facility but has declared that that underground facility is not going to be the repository. Nobody opposes the repository because they don't know where it is. They look good but have not sited.

I think we are ahead of everyone with regard to the business of dealing with the location of the site.

Mr. MYERS. What about Carlsbad? What do we know about the salt?

Admiral GUIMOND. That is mine.

Mr. MYERS. I would hope Dr. Dreyfus has concern too.

Mr. DREYFUS. I watch it very closely.

WASTE ISOLATION PILOT PLANT (WIPP)

Admiral GUIMOND. We do share information on that back and forth.

As you know, the WIPP site is one we have constructed. We are working very hard to get all the information into criteria to be presented to the EPA, hopefully so they can find it suitable, that it can be shown to meet their standards and that we can proceed with actually beginning to emplace waste in 1998. That is our target date now.

We are working—that presumes that, one, we have to get information to EPA and once reviewed, it will be passable. That is our goal.

At this stage we are optimistic. We have had discussions and dialogue with them. They are prepared to very rapidly but thoroughly look at the information to ensure that it is going to meet their standards and then we will proceed.

Mr. MYERS. It seems it is taking an awful long time. You have been testing that hole down there. How long can you look at a salt dome?

Mr. Bevill says he thinks if he came back sometime in the 21st century you would still be digging that hole out there, the same people. He thinks you all have permanent jobs. They will still be there in the year 2100, still digging that hole. That is the way I feel about the WIPP site.

Admiral GUIMOND. I, previously to the current position I have, ran a couple of programs at EPA, and one was the Radiation Standards Program. So I first interacted with the WIPP site in the early 1980s when it was first beginning, from a regulatory standpoint, and it has certainly taken a long time.

These siting issues, these emplacement issues, are of very serious concern to the people in the communities, environmental communities, regulatory communities. They see this is going to be in there for a long period of time once it is placed, so they would like a fairly high degree of assurance that it is the right thing to do. We are investing lots of time and lots of money trying to provide that degree of assurance.

Mr. MYERS. My last question: It appears, from what this committee has knowledge of, that community acceptance is a lot higher in New Mexico than it is in Nevada. They are almost anxious: When are you going to bring it to us? Some have said that. You didn't get spoiled over at EPA, did you, Admiral? Get some bad habits?

Admiral GUIMOND. I may have bad habits, but unrelated to this.

Mr. MYERS. I hope you are not using EPA as a benchmark on progress.

Admiral GUIMOND. Not at all. You are right; the Carlsbad community, I think, are welcoming it. They are very interested in pursuing it. They believe that the risks are minimal. We are doing everything possible to mitigate against those risks.

I think probably folks from other community areas are concerned about transportation issues, and also concerned about intergenerational issues of waste that are ones we are trying to provide that assurance to these days.

Mr. MYERS. I have other questions. I have used my 10 minutes.

Mr. Knollenberg.

Mr. KNOLLENBERG. Mr. Chairman, you can ask as many as you want.

Dr. Dreyfus, if I haven't asked you a question, it isn't because I am ignoring you. Most of my questions relate to the expertise of the Admiral. I do like some of the things I see over here in terms of being ahead of schedule and under budget. I think I heard that too.

I want to come back a little bit to this, the projected time frames for getting out of this thing. I have got some idea from the BEMR, an unofficial document, I believe—it may be official. But how realistic is it in terms of these sunset dates, or these final dates?

I would start with Hanford. What is your vision of when?

CLEANUP SCHEDULES

Admiral GUIMOND. Let me put the BEMR in context. One of the things—I think that if you are trying to improve something, if you are trying to shorten time frames, you can't do that until you have taken a baseline look at things, to know, based on current technology, based on approaches people might be using, based on the decisions they envision the community wants, what will be the status quo if you apply that. That was the purpose of the BEMR report, to go out and take a look at that last year.

Compiling that information, we got a baseline idea that if, under a number of assumptions, certain land use assumptions, assumptions of how things were proceeding, it would take many decades and cost $250 billion, as we looked at that, we found that is not very acceptable to us. The time frame is way too long, and the dollar expenditure is way too much. That then gives us an ability to go back and say what do we need to do to change those figures.

What that means for us—Rocky Flats is a good example. Look at Rocky Flats. Through the DOE people at Rocky and the new contractor out there, they have been working on a revised vision, they have been working on that end point.

Mr. KNOLLENBERG. Currently it is 2065, out of the BEMR.

Admiral GUIMOND. Yes, but that is prior to us saying that is not very good, let's work hard at improving that.

They have now had a lot of dialogue with the community, with the regulators, internally, and we just signed an agreement, basically signing up with the State, with EPA, ourselves, and community involvement, just looking at a vision of trying to get there in about 15 years.

Mr. KNOLLENBERG. At the same projected level of funding?

Admiral GUIMOND. No. At a projected level of funding comparable to what we are putting into it each year.

Mr. KNOLLENBERG. It changes drastically the final number.

Admiral GUIMOND. Dramatically.

Mr. KNOLLENBERG. In the BEMR report and in your studies, are you taking into consideration all the participants that are going to be in the mix of this?

Admiral GUIMOND. We are certainly trying to.

One key thing the BEMR did is allow us to put on the table a number of assumptions, and that opened a dialogue between us and the regulators, the State people, and community people. A lot of them said, like you, it is not acceptable to have this done in 2050, 2060, or something along those lines.

If that is true, if we can agree, we can sit back and say: What choices do we need to make relative to future land use? Do we need to do a Mercedes cleanup or can a Chevy fit here? Do we need to clean it up so we can have people living here, or can some land be used for other uses?

That dialogue is under way now, and that dialogue is resulting in what we see at Rocky Flats. We believe we are going to be able to reduce the time frame for the cleanup dramatically into the 15-year range, if all things go well, and significantly reduce the cost.

Now let me add one aspect to that though. If I take a look and say, okay, when the contractor first came back to us and said we would like to see a bump-up. If you invested, instead of $500 million a year, if we put a billion dollars a year in, we can do it faster. That is nice, but I don't have that much money to invest here. I have a number of other problems that have to be taken care of.

That is where we get to the point of saying, how can we get more money going to those real direct activities? How can I get more money going to clean up or going to the plutonium stabilization without increasing that $500 million a year?

That is where I get to the point I made to you before, doing the mission direct and the support activity. I have got to mine money out of what I am putting there so more of that $500 million is going from support over to mission direct. That is the strategy we are trying to follow at all sites.

Mr. KNOLLENBERG. Is this going to be the same at Savannah, Idaho——

SCHEDULES FOR COMPLETION

Admiral GUIMOND. Same basic strategy.

Mr. KNOLLENBERG. So the BEMR report with its projections of sunset are, in your judgment, outlandish or——

Admiral GUIMOND. I wouldn't want to use the word "outlandish." I think it was a good start. We looked at it and concluded that it wasn't very satisfactory to all of us, the community people, the regulatory people, and ourselves, and that opened the dialogue.

So what you see now is Rocky having dialogue; at Fernald we have had the dialogue; the same thing is going on at Hanford, and a wide variety of the sites, so that, I think, will ultimately result—this is iterative, because people have to be able to come to grips with some of these longer-term decisions, the land use decisions, whether you are going to have residential-use or make it park type land.

With these dialogues going on, we are improving the use of the dollar, being more effective and efficient, and we are doing it smarter.

Mr. KNOLLENBERG. In terms of some new things taking place like contract reform, you are doing it more on a performance based method now. There is privatization involved, I understand?

Admiral GUIMOND. Absolutely.

Mr. KNOLLENBERG. Compliance obviously is something to deal with.

Another thing that is available now that wasn't perhaps 3 or 4 years ago is technology. I happened to view something put out by DOE that indicated they can now survey, in like an hour or so, land that has high-level waste or at least significant levels of waste. They can do what used to take 3 months in an hour and a half.

Admiral GUIMOND. Right.

Mr. KNOLLENBERG. Those kinds of things have to bring down your cost; they have to bring down your sunset time. I don't know how you factor those into the mix of this, because it ain't easy to pick up on what the future is going to bring.

But maybe this rush with more money—I think I heard you say you are not going to get the billion dollars in place of the half-billion dollars——

Admiral GUIMOND. I was referring to Rocky Flats.

Mr. KNOLLENBERG. Maybe there is a potential to move too fast. If we can merely secure safely for 30, 40, 50 years and get it to a point where we can put it in that hole you are digging out there, Dr. Dreyfus. I know there are some political ramifications involved here. There are some touchy things—local interests, other government agencies involved—but perhaps we can secure some of that to a point where we don't have to spend exorbitant sums every month waiting for technology, but secure it in a way that there is no risk to the local people.

For example, maybe we focus more on Rocky Flats, get rid of it, secure those things at Hanford and Savannah in a way that they are not a threat to people but we can phase it out sooner. It might be possible—and I am not speaking for this committee—to find some money that would accomplish that end if it would work with the right skill mix and all the other factors and other things that have to be looked at.

BUDGETING FOR ENVIRONMENTAL MANAGEMENT

Admiral GUIMOND. We agree with you.

For example, next month we will be taking a look at our internal review budget process for 1998. We have asked each site to present to us their proposed budget arrayed in a couple of ways. One is where we would, if you will, maximize risk reduction, one that would maximize compliance, maximize reduction of mortgage, sort of safe securing, if you will, of a number of things back and forth. After we look at the whole site we can come out of that with an optimum proposal which is going to deal with those things so that we can optimally use the resources back and forth.

We agree. We want to take care of all the urgent risks. As a consequence, last year we reduced the number of worker lost days by 50 percent on our sites. We are with you on that 100 percent.

At the same time, let's not waste any money doing something that is stupid while either technology might come in down the road or while we see alternatives.

So by looking at those optimum cases, we think we can put a good base program together and with marginal dollars that are on the edge to make the best investment.

One other element is how each site is improving their cost-effectiveness.

Mr. KNOLLENBERG. Would they do it with performance-based contracts?

Admiral GUIMOND. With that, and remember the breakdown between mission direct and support? I am looking at how each site is moving the mission direct and support. If either you give me enough money to be able to do it on the margin or I got a little marginal resources, I would want to invest that extra dollar where I get a dollar's worth of return, not where I get 50 cents' worth of return. That is going to help us make sure those marginal dollars are invested in the places where we get the best return.

Mr. KNOLLENBERG. What would you say are the highest risk areas in the whole EM Program today?

HIGH RISK AREAS

Admiral GUIMOND. Well, the highest risks we know are plutonium, stabilizing plutonium around our particular sites where we have liquids or unoxidized materials or various residues that need to be dealt with.

Mr. KNOLLENBERG. Would that be Hanford?

Admiral GUIMOND. There is some at Hanford. Rocky Flats is another particular area; some at Savannah River. The others are high-level radioactive wastes. Millions of gallons of high-level radioactive wastes. We have in tanks at Hanford, at Savannah River and at West Valley clearly that present very potential high risk and have to be watched over very carefully.

The other is spent fuel. We have a lot of deteriorating spent fuel in places like Hanford, in Idaho, in Savannah River that need to be stabilized and have a better, secure way of watching over them for many decades until a repository comes on line. Those are the highest risks we are dealing with at the moment.

Mr. KNOLLENBERG. Final question. Perfect can be the enemy of good. And how clean is clean? And if we search for excellence, we can sometimes—the law of diminishing returns takes over, and it becomes needless and we haven't done anything at all except spend money. As long as there is security about it that people are not at risk. And I am sure you have tackled this problem, but there are ways, obviously, of getting to a point of making good the enemy of perfect.

Admiral GUIMOND. There are, but I think we are turning it around.

Mr. KNOLLENBERG. Do you think we are moving in that direction?

Admiral GUIMOND. No, I think we are reversing it. In the earlier days perfect was the enemy of good. We were looking at options. Sometimes we would be oppressed by the regulatory or the way some of the people were interpreting the State RCRA or Superfund laws. We clearly want to protect public health, but we do not want perfect to get in the way.

If we could take care of 80 percent of the risk in the next 10 years, we will have made dramatic improvements and used taxpayer dollars quite wisely. We would then put ourselves in a position where we could think hard about how much we need to spend and over what time frame to take care of that remaining 20 percent.

Mr. KNOLLENBERG. Thank you. That concludes my questions, Mr. Chairman.

DEFENSE WASTE PROCESSING FACILITY

Mr. MYERS. Admiral, the defense waste processing facility at Savannah River, you are finally on line? You are vitrifying; is that right?

Admiral GUIMOND. Yes, it is starting up and running through. We are still in the early stages of the testing. And the radioactive logs have not come off the line yet.

Mr. MYERS. I thought you had done the dry run a long time ago.

Admiral GUIMOND. We have done the dry run many years back. We are moving the materials throughout the plant right now, but it is still in the final stages. It is a long train of events from where we start it up to get to the end. We have a few last things we want to check on the melter, but I expect radioactive logs coming off shortly.

Mr. MYERS. How many canisters are you going to process in a year now?

Admiral GUIMOND. Next year we are looking at the 100 to 200 range.

Mr. MYERS. As I recall, when you requested—not you, but your predecessor was requesting funds for the Savannah River facility.

It was 500 canisters per year. What happened to that design? Didn't we vote for that?

Admiral GUIMOND. The facility is, I think, designed to be able to do in excess of 400 per year. And we certainly want to move in that direction.

It is a new facility. It is up and running. We don't want—we don't want to have done it in such a way that we stub our toe along the way. Take a year to get a hundred to 200 through, build on that experience, learn how to operate it and then build from there up into the 400 number. Yes, we agree that we want to move the number up in time. I am just saying that I am not going to go from 0 to 400 in one year.

Mr. MYERS. Back to you, Dr. Dreyfus, our favorite whipping boy here. I shouldn't say boy. That is not politically correct. I am older than you are so I can say that.

Again, are we going to be on line by the year 2002, assuming that everything works out like we plan?

YUCCA MOUNTAIN

Mr. DREYFUS. Assuming that everything works out, we will file an application to construct in 2002, and we should be able to emplace waste in 2010.

Mr. MYERS. 2010. That is just 12 years late, isn't it?

Mr. DREYFUS. No, sir, that is the date we have had since I came on board.

Mr. MYERS. That was not contract——

Mr. DREYFUS. It was 2013 the day I arrived and we have made two major reductions in the cost that is associated with that. Our first plan cut a billion out of it, out of the cost to license application. We are in this current proposal cutting another billion out of it. But the date is pretty much the same date that we have had in this program for a while. The trick is to actually do it.

Mr. MYERS. The nuclear utilities, the generating facilities are now paying one mil per kilowatt hour and that was the agreement Congress provided to build a trust fund to build this. And the agreement was we would take that waste by the year 1998. That is less than 2 years off.

LITIGATION

Mr. DREYFUS. The expectation was that it would be taken by 1998. Yes, sir.

Mr. MYERS. And there are a lot of utilities—I am going to ask you about lawsuits in a moment. I don't think any injunctions have been issued at this point, have there? Have you had any?

Mr. DREYFUS. There has been no action yet. There has been oral argument.

Mr. MYERS. They have a legitimate cause here. They are paying the contract. The agreement was that the Department of Energy would accept this waste by the year 1998 and now it is a long way beyond 1998. Maybe when you came on board, but now we still had that original contract that the Department of Energy made with the utilities, and we haven't met it and the utilities are complaining. And some communities and States are beginning to rattle their chains. They may do something about it. What is the status? There are lawsuits, are there not?

Mr. DREYFUS. Yes, sir, there are lawsuits.

Mr. MYERS. How many?

Mr. DREYFUS. There are two major suits that have been consolidated. There are a large number of litigants.

Mr. BARRETT. There are 20 some combinations of State Attorney Generals and utility corporations. Twenty-seven, I believe.

Mr. DREYFUS. Twenty-seven parties to the case.

Mr. MYERS. What is the status of the litigation?

Mr. DREYFUS. There has been no action by the court. This is in the U.S. Court of Appeals.

Mr. MYERS. It is exploratory?

Mr. DREYFUS. No, sir, it is a live case.

Mr. MYERS. Have you had to testify?

Mr. DREYFUS. No, sir, we are represented by the Department of Justice in the case. It is the U.S. Court of Appeals panel where the jurisdiction lies for this. So they start right out with a panel in the Court of Appeals. It is that sort of a case. And since they are suing the United States, the representation is by the Department of Justice.

Mr. MYERS. You may have good lawyers, but what will they know about the expertise as far as what your ability is to meet this agreement?

INTERIM STORAGE

Mr. DREYFUS. The ability to meet the agreement turns pretty much on historical circumstances and the facts of life. We have no facility to which we can take waste at the moment. And we are unlikely to have one by 1998. The General Counsel of the Department has said that his interpretation of the law is that in the absence of a facility, we don't have an obligation. Should he be declared wrong by the court, then, of course, we would have an obligation, but we still would not have an ability. So under contract law, if performance is not possible, compensation might be.

The history of the thing, as you probably remember, is that the Department proposed an interim storage site which Congress vitiated, and at that point, this was 1987, the Congress took the authority away from the Department and placed it with the Nuclear Waste Negotiator. And The Negotiator did not achieve anything and has now gone away.

So, the interim storage situation remains what it has been. That there is no site. Pending legislation could eventually declare a site, but that has its own story. I think probably in 1982, people thought that the repository might come to fruition by 1998, but it has become apparent for a good many years now that it couldn't and that is where we are.

Mr. MYERS. I take it, then, the official position of the Department is that they have no obligation to start accepting this in 1998? No definite time?

Mr. DREYFUS. We certainly have no ability. And the formal opinion of the General Counsel is that in the absence of an ability, we don't have a legal obligation. And that, of course, is what is being tested in court.

Mr. MYERS. Of course, originally the concept was to have one or two monitored retrieval storage sites. And I contributed to that. I thought it was a waste of money. But now I think we made a mistake. In hindsight we should have gone the MRS route, but nevertheless we haven't so we have to move from here.

We set aside out of the $400 million last year, $85 million for the interim storage consideration which has not been spent at this point.

Mr. DREYFUS. No, sir, it is not available to me to expend. It is held pending the enactment of legislation.

Mr. MYERS. Which we provided.

Mr. DREYFUS. We have not, in this budget that we are proposing to you here, anticipated getting it. We have not requested the release and we don't anticipate it. This is $400 million of new discretionary authority to do the Yucca Mountain and the ongoing obligations that we have in the program.

The expectation would be that should the Congress, in fact enact the legislation this year or subsequently, the $85 million would become available, along with the legislation and would fund the first year of activity in building an interim storage site. So that bill which is pending is inherently self-funded and this proposed budget preserves that fact.

Mr. MYERS. I will jump back to something that is very much related. The lawsuits that you are now involved in you are represented by the Justice Department. What are the Justice attorneys telling the plaintiffs here who are begging for help? What kind of explanation do they give? Do they give them any hope at all or do you know what they are saying to them?

INTERIM STORAGE SITE

Mr. DREYFUS. No, the stance in court is essentially that there is no site, and there is, therefore, no obligation. And, of course, from a program point of view we intend to accelerate the work at Yucca Mountain to the greatest extent possible. The Administration's position with regard to the congressional activity that is now ongoing, most recently in a letter to Senator Murkowski, states that the Administration believes that the selection of an interim storage site and particularly putting one in Nevada, should be informed by whether we have a repository site in Nevada and we can know that adequately in the 1998 time frame.

In other words, the data we are trying to get by 1998 would adequately inform a decision as to whether a repository ought to be in Nevada or not and that no action should be taken other than nonsite-specific preparation action to site or construct an interim storage facility until after 1998. That is the position at the moment.

Mr. MYERS. So, the Department's position is that it is opposed to an interim site consideration?

Mr. DREYFUS. The Administration's position is opposed to selection of an interim storage site at this time. If it were selected in 1998, it could be available in 4 years' time thereafter, given the kind of legislation that is before the Congress. It would take longer without that legislation, but that legislation provides a lot of procedural expediting factors. So, we would be looking at 4 years thereafter in the receipt of waste.

Mr. MYERS. We are back to square one? Start over again with an interim site, even though as bad as it is needed? It is not as simple as going out and building a big concrete structure and start stacking this——

Mr. DREYFUS. Construction of an interim storage site is not a difficult situation. Selection of the site seems to be, but it is not a difficult construction.

It would require a license. And it would require the Nuclear Regulatory Commission under the House bill, to write an environmental impact statement. There has got to be built a transportation infrastructure that doesn't exist. So, there is about 4 years from the starting gun from the selection of the site to the movement of waste.

Mr. MYERS. We haven't got 4 years. How can we expedite it? There are those who say we can provide for storage on site at the various locations of generation now by improving—has the Department given any consideration to helping these utilities about providing for interim storage on site at the generation station now?

Mr. DREYFUS. Well, that, of course, is what they are doing.

Mr. MYERS. They are doing through necessity.

Mr. DREYFUS. Yes.

Mr. MYERS. We have spent $10 million in North Korea because they left it laying in water out there and it is all deteriorating. Are we going to have that site in a number of locations like that here? We gave them $10 million last year because it was so dangerous to the North Koreans because they had neglected their storage site.

Are we going to have multiple sites in this country from the utility sites since we cannot handle them now and we have to spend billions of dollars cleaning up those sites because we haven't done anything to alleviate this?

MANAGEMENT OF WASTES

Mr. DREYFUS. Well, as I have testified before in a couple of committees, I do not favor the notion of leaving nuclear waste at reactor sites for an extended period of time. I don't think there is any imminent safety issue, but I think it would be imprudent as a management concept to say let us just leave it there and think about it for several decades.

I do think that over time, and particularly as reactors are shut down and cease to be a nuclear site for any reason except the management of wastes, that one can expect to have a degrading situation. I also don't think it gets easier to take the waste away from reactor sites. But I don't think that that represents any safety consideration over the next several years. The difference between 1998 and 2010, for example, I don't find a safety consideration.

Now, there is certainly an economic consideration, and I appreciate that very much. And there is also a tremendous equity consideration here in the way in which we are dealing with the Nuclear Waste Fund. As I say, in this coming fiscal year this program will contribute about $700 million to deficit reduction from the collections from program beneficiaries that are not appropriated.

We are not asking to have it appropriated and that has been the history of the program. And I think that is not the right way to do it. And we have had that conversation. We have not proposed to take it off budget this year. We did propose that last year unsuccessfully. The pending bill in the House does do that. I think it would be appropriate. It would resolve some of the equity questions.

So, we have the equity question. We are collecting the funds. We have the economic impact of leaving it at the reactors, which will be borne by the utilities and the ratepayers of the utilities. And it is a public interest certainty that we ought not to adopt leaving it at the reactors as the long-term strategy. That would be, I think, a very, very serious mistake. But if we get into the question of 1998 versus 2004 or 2005, there I become a little less married to the notion that we have got to do things quickly.

I think that this repository program is important. I think an interim storage program without a long-term strategy is a bad idea. I am concerned about the interim storage program competing with the repository program for resources. I would hope that would not happen, but my experience of the last few years tells me that it probably would.

I would like to see the 1998—the work that we have to do between now and 1998 done. Those are basically, the factors at work here and they obviously are tough political issues which will have to be resolved in the Congress. Nobody else is going to be able to site that facility.

Mr. MYERS. Obviously it will have to be done that way. And maybe we will have to change—I don't have the crystal ball, but I think there might be stronger language this year, my guess.

Mr. DREYFUS. There is work that we can do in the absence of a site that would——

Mr. MYERS. For interim storage?

INTERIM STORAGE LOGISTICS

Mr. DREYFUS. Yes, sir, that would, in fact, address some of the long-term problems. We can go forward and will if you will let us, go forward with a procurement approach to begin to get the vendor community involved and organized to do the transportation job.

I would not underestimate the logistical difficulty of getting that done. And I think that if we go out with preliminary procurement actions, seeking interest, figuring out how those contracts have got to be crafted in order to get the private capital to be invested in what essentially is a one-purpose capability, that that will help.

I think we could also approach the Commission on the licensing of a phased storage facility such as is described in the House bill without being site-specific. And while that is not the best progress to get the thing built, it could very well resolve some as yet open questions about what the Commission will require, how we would go about it, and what kind of a safety case we would make.

Now, once the site is selected, you have got to go back and do the site-specific work and the environmental reports and that sort of thing. But these two actions are useful and we can embark on those without the conflict that exists between the Administration position and the Congress particularly obstructing them. But they are good for a year's work of activity, I think, that otherwise might have to be done after site selection.

Mr. MYERS. And I take it you don't feel you have the authority to do that today without further authorization.

Mr. DREYFUS. I think I have the authority to do it. I haven't got the funds to do it.

Mr. MYERS. Did you make a request for funds for this?

Mr. DREYFUS. I can begin to do those things with the program we have proposed for 1997.

Mr. MYERS. In the $400 million, you can do that?

Mr. DREYFUS. There is about $10 million in there that is associated with waste acceptance and storage. And I can go forward, but not to the point of an actual procurement. At the time that I try to put a procurement on the street for transportation, then I am looking at very large amounts of budget authority. At that point I would either have to have the $85 million that is in reserve or supplemental appropriations of that order of magnitude. But I can go up to the point of an obligation.

Mr. MYERS. I have two or three more questions, Joe. Do you have any more questions?

Mr. KNOLLENBERG. The only question I have is actually not a question. I ask unanimous consent to submit a couple of questions in writing to both gentlemen and that will give me, I think, the information that I need, and, again, thank you both very much.

OVERSIGHT AND REGULATORY GROUPS

Mr. MYERS. In siting and licensing and permitting, you mentioned that it will take some time. Now, all these people are supposed to be watching what you are doing out there. The Nuclear Regulatory Commission, how many people do they have on site at Yucca Mountain?

Mr. DREYFUS. About two people on site. We do get lots of visits and a whole lot of interaction with the much larger staff that they have in Washington. But there are only two people resident at the site.

Mr. MYERS. Aren't you still having to turn paperwork into them? I thought this was to eliminate the unnecessary——

Mr. DREYFUS. We do have—it is not the same as it was. At one point I think I reported to this committee that there was about $35 million of Nuclear Waste Fund money appropriated to oversight groups that——

Mr. MYERS. You are not paying that are you?

Mr. DREYFUS. You are paying it out of the Nuclear Waste Fund.

Mr. MYERS. But it is not out of your allocation.

Mr. DREYFUS. Not much comes through me. That is not as large this year by a considerable amount, but there is a large regulatory community and we do interact with them and we do interact with the Nuclear Waste Technical Review Board. That takes time. You are dealing with a staff of 100 regulators. It takes man-hours to respond. So we have that burden. I am not suggesting it is excessive. I am suggesting that it is a burden and it has to be paid for and it takes people and time and preparation and submittals.

I do think it is getting better, and we will come out with a rulemaking this year which will propose to reduce the amount of work that we intend to do between now and licensing. My initial impression is that it will be well-received by the commission, but I don't want to commit them to that, and I don't know that for sure. And they don't have enough information at this point to be sure, I am certain. But we will propose to cut a lot of cost out of the regulatory side of the program.

STATE OF NEVADA FUNDING

Mr. MYERS. There was a time up until this 1996 appropriation where we gave some allocation for the State of Nevada.

Mr. DREYFUS. Yes, sir, and I must admit that I am proposing to do it again in 1997.

Mr. MYERS. What do we get for it? A lot of heartache and grief is what I hear from the delegation. It didn't help us a bit.

Mr. DREYFUS. This is a very difficult situation and in the past, I have tried not to discuss it. Basically there are two aspects to it. First of all, the 1982 Act establishes a responsibility and a position for the State and the effected units of local government to oversee the program, and participate in the program, and do independent studies and request information.

Now, the Act does not specify a particular level of funding, but it does specify that the funding to do that would be a pass through from the program. And since this time the program has proposed, and the Congress has appropriated, levels of funds. Therefore, we are where we are in which that practice exists and has an expected level of funding.

Since my tenure, I have simply prorated the amount of funding to the level of activity at Yucca Mountain. I would make the pitch to you that with regard to the rural communities and the rural counties, it is important for this program to be institutionalized in those counties. In other words, those people that are immediately concerned with the program ought to know what is going on. It is difficult to communicate with rural counties and scattered populations and I think they need the ability to have their own presence. And it certainly eases my life because they know what I am doing, and I don't keep getting caught in situations, one way or another, where we have not made them aware of things. So, I have an appreciation for my relationship with Nye county which is the county we live in out there, and with the other counties that will be impacted if there is near-term transportation or will be impacted eventually by transportation.

STATE OF NEVADA ACTIVITIES

The State and Clark County, of course, are much more capable of mounting that kind of function by themselves because they have larger tax bases and more in-house staff. But I am not in a position to pick and choose among my overseers, and therefore, I propose to fund them all pretty much at the level they were funded at the last time you agreed. I would like to ask, however, if the committee takes a position on it, to put it in the statute so that I am not between two statutes.

Mr. MYERS. We understand that. I don't blame you. We are not faulting you. You live out there. What did you get—when we were funding the State to provide this oversight? How did they spend the money, the State?

Mr. DREYFUS. Well, of course——

Mr. MYERS. What did they get for it I am asking?

Mr. DREYFUS. What do they get? They do economic studies. They prepare materials to state their position on the project to their constituents. Information. They seek information from us, which they watch rather carefully. They raise objections.

Mr. MYERS. They raise what? Objections?

Mr. DREYFUS. They raise objections to us if they find that we are doing anything that they feel we should not.

Mr. MYERS. What would be an example of what they think you should not be doing?

Mr. DREYFUS. Let's see, can we think of one that was raised? That was raised by the State?

Mr. BARRETT. Well, the State has questioned hydrology.

Mr. MYERS. Do they have hydrologists that sit and watch what we are doing? The State of Nevada?

Mr. BARRETT. They have consultants.

Mr. DREYFUS. They have a staff.

Mr. MYERS. Was this contracted out? They hire a contractor?

Mr. DREYFUS. They do frequently.

Mr. MYERS. Pardon me for interrupting.

Mr. BARRETT. That is the answer. It is both. Some is in-house and some is contracted through consultants.

Mr. MYERS. We have not funded them this year. Are they turning their back and are they doing something on their own? They are in a better shape than we are, Nevada has a better share of income than the rest of the country has.

Mr. DREYFUS. The State of Nevada is still functioning. I am not sure of the source of funding. Part of it may be carryover funds. They have always had some support from the State other than what we have given them. They are not sole source funded. Some of the counties are laying off staff and retrenching. We intend to fund some of the work that Nye county was doing on site because it was integrated with ours. And we want to preserve the data series. There is about $600,000, that we will pick up as site characterization work, not under the provision of the act, but as simply funded work that we feel needs to be done.

Mr. MYERS. I can sympathize with the people who have testified, local county commissioners, and I am sure the Governor has a lot of heartache over this thing, too. But it will bring a lot of money into Nevada if it is finally sited there. But I wouldn't blame anybody from objecting to it from the local standpoint. But I have a large concentration of a very lethal toxic material in my district. And trying to alleviate the local objection, we provided that they could—I think we give them $96,000 a year for two or three years.

What did they do? They went out and hired a college professor whose only qualifications were that he was opposed to the project. We could hire Ralph Nader to do that and not pay a penny. They didn't hire expertise. They might as well have hired a public relations firm to oppose the program. That is what I am often objecting to, this way they misappropriate the funds. And I understand your position. Let the record show that you testified you need the funds so the record will show that.

Well, in closing, you were asking for $400 million, and for that you are going to complete by the end of calendar year 1997——

Mr. DREYFUS. I will complete by the end of the 1998 fiscal year——

Mr. MYERS. Fiscal year now?

COMPLETION OF YUCCA MOUNTAIN

Mr. DREYFUS. Various things happen at various times, but we will close on all significant outstanding technical considerations by 1998. We will then be in a position to complete our environmental impact statement, our license application and the formal agency representation to the President that is required by the Act. There is a long procedural effort there which includes the right of a State veto and a potential congressional override and ultimately the license application to the commission in 2002.

Mr. MYERS. Okay. It will be turned over to the hands of the people we never see and hear except in writing to make the determination about licensing and permitting from that point? From the end of fiscal year 1998?

Mr. DREYFUS. No, between 1998 and 2002 we will be carrying out the remaining procedures required by the Act and preparing the actual application. We will complete our technical—we will resolve—as you asked before, is there any reason this can't go forward——

Mr. MYERS. How can we expedite it?

Mr. DREYFUS [continuing]. We will answer that. If there is any reason why this is not a viable proposal, we will know it by 1998.

[The information follows:]

VIABILITY ASSESSMENT DECISION

The Viability Assessment is a response to Congressional concerns expressed in 1996, related to the feasibility of geologic disposal and a geologic repository located at Yucca Mountain. To address the viability of the concept of geologic disposal requires OCRWM to demonstrate the feasibility of moving forward with a geologic repository at Yucca Mountain. The 1998 Viability Assessment will consist of:

Advanced total system performance assessments for a geologic repository; based on the body of scientific and technical knowledge gained during site characterization and engineering design.

More specific design work on the critical elements of the repository and waste package.

A plan for submitting a docketable license application to the NRC, assuming the site is found suitable.

An estimate of the cost for preparing the license application and construction/operation of the repository.

In view of the limited resources available in FY 1996 and the required lead time for testing, data collection, and design work, 1998 is the earliest date possible for this package of deliverables.

Mr. MYERS. Is there any way that can be expedited?

Mr. DREYFUS. Not that I can conceive of.

Mr. MYERS. Would you look at it and let us know?

Mr. DREYFUS. There are simply some time lines and doing some things that are necessary to having that answer. And I don't think you can expedite it.

Mr. MYERS. I know in a couple of instances you have requested more money than the OMB—than the administration has come down. Is there any place we ought to be appropriating more money? Not that we have got it, but in case it was available?

Mr. DREYFUS. I believe that this appropriation request is adequate to do the optimum job at Yucca Mountain. And if it were not, I probably would tell you.

Mr. MYERS. If they turned over one of the casinos in Las Vegas to you and you could use all the funds out of there, you wouldn't spend it in any different way?

Mr. DREYFUS. With this amount money I will fully fund the activity at Yucca Mountain, and we will get to the answer by 1998 and we will file an application in 2002.

Mr. MYERS. Again, I am sorry I was a little bit late getting here.

Mr. DREYFUS. I think it is the lowest cost program that is, indeed, capable of being licensed. I do.

Mr. MYERS. I apologize for getting here a little bit late and I harangued you here for over 2 hours. I don't know of any greater responsibility that you and we have than these programs. I think it is one of the highest priorities. It has been since I have been on this committee. I hoped that we would have a decision made before I left Congress, but obviously we are going to have to turn it over to the younger Members here. We didn't get the job done.

I, for one, think we have got to reprocess. I think this country is making a terrible mistake. I do not think we will ever satisfy that problem until we start reprocessing. If we start putting in the repository a much lower grade of material, as hot as it is, I think we will have a lot less opposition to it. That is what other countries seem to be doing, and that is what we are going to have to do. It is a terrible waste of money to bury all of that value without reprocessing. We would bury 3 percent instead 100 percent. That is a big difference in my judgment; the volume, if nothing else.

Mr. DREYFUS. We will still have to prove up a repository. Should it go that way, this will not be a wasted effort, I can assure you.

Mr. MYERS. This administration, and I guess some of the others opposed—I don't want to be political at this point, but I think we ought to have somebody down there that looks at the bigger picture. And we are going to have to reprocess. I think this committee has taken that position. We stand kind of alone, but I think that decision will finally be made. Yes, you have to have the site characterization and the repository. But the volume itself is reduced significantly.

GEOLOGICAL REPOSITORIES

Mr. DREYFUS. It is reduced significantly, but regarding the volume and the toxicity and the heat, the order of magnitude of changes don't, I think, change the problem.

Mr. MYERS. The half-life changes, the toxicity changes, it is not near as hot.

Mr. DREYFUS. Yes, but if we look at the regulatory proof, the proof of assurance of future safety, the difference is not so great that one would have a vastly different programming. If you look at the programs in places like France, the geologic repository programs, they pretty much have got the same need to make the same proof. There are differences. I am not suggesting there are not differences. And it is simpler. But I don't think it would be an easy program, even if we reprocessed.

Mr. MYERS. COGEMA, of course, is doing a good job of reprocessing for other countries in the world, too.

Mr. DREYFUS. But they haven't got their geologic repository sited and proven up and they will have to do it sooner or later.

Mr. MYERS. A few years ago they had it just stacked up. And now they are digging it out. I don't know what they are going to do with it. They had it stacked in sheds.

Mr. DREYFUS. Glass logs very much like Admiral Guimond's glass logs that I am going to have to put in a repository some day.

Mr. MYERS. You have done a good job. And cutting the money didn't do the damage that some of us feared it would. We thank you for that. You have done a good job. Admiral Guimond, you, too. But don't expect a lot more this year.

Admiral GUIMOND. Just give us what we ask for.

Mr. MYERS. You didn't get the message, did you? I am trying to be kind about it. I realize there is a lot of pressure on both of you. And blame us, I guess. And we catch it here, too, from our colleagues. When you cut money it cuts payroll. But we just simply—I go back to benefit costs. We have not gotten good return. And you cannot put the blame on anyone.

Maybe the process or the procedure was to blame and we contracted out with contractors who were inexperienced and had a lack of expertise to do the job. But you have done a much better job. Keep doing the good job because less is coming, I think. So thank you for the job you have done. Thanks for your patience today, and I apologize for getting here late. The committee will stand adjourned until 10 o'clock tomorrow morning.

[The prepared statements of Admiral Guimond and Dr. Dreyfus, the questions and answers for the record, and the statement for the record and the budget request for the Nuclear Waste Technical Review Board follow:]

GENERAL

Mr. Myers. As part of the conference on the FY 1996 Energy and Water Development Appropriations bill, the conferees committed to work with you to fix legislation which was driving up the cost of cleanup or causing inefficiencies. What legislative changes do you recommend to improve performance of this program?

Admiral Guimond. A significant portion of the Environmental Management Program budget is driven by compliance agreements. The Superfund law is one of the principal legal drivers for these agreements. Addressing shortcomings in the law should facilitate the Department's effort to achieve greater results more cost-effectively.

Many of the desired improvements are already being addressed by the Environmental Protection Agency (EPA) through implementation of administrative reforms to the Superfund program. The Department is working with EPA to implement administrative reforms to the current program. These reforms are addressing a number of the more serious problems such as consideration of land use, elevating the role of cost, and identifying a lead regulator.

Nonetheless, the Department continues to support revising the law to codify these reforms. Only through statutory change can we ensure a more stable statutory framework that gets the job done in a manner that is both cost effective and protective of public health and safety. Some specific changes to the Superfund Law that are needed include:

First, the Superfund statute needs to codify the requirement that future land use must be considered in the remedy selection process. Future land use should be considered throughout the remedy selection process as it is required to be under current EPA directives.

Second, better provisions for community involvement are needed. Superfund should be reformed to incorporate community involvement earlier in the remedy selection process. For too long, community groups have felt shut out of the process of site remediation decision-making, discussions of future land use options, and the risk evaluation process. Progress has been made, but community involvement should be mandated by statute to be an integral part of the remedy selection process that will, in the long run, make the risk assessment and management process more open and more democratic.

A dramatic illustration of the value of citizen participation in land use and cleanup decisions can be seen at our Fernald site. After the Fernald Citizens Task Force examined and analyzed conditions at the site they concluded that different parts of the site would be suitable for different future uses. As a result of the collaborative process with the site contractor, the Department, and the regulators, recommendations were made which will save time in completing the cleanup and an estimated two billion dollars in costs over the life of the project. We need to have this type of process codified in Superfund. Besides demonstrating accountability and democratic principles, the Fernald case shows how citizen participation can be economical and a very "profitable" return on investment.

Third, to address the problem of overlapping state-federal roles, the EPA Administrator should be authorized to delegate Superfund authorities to the states. The Department of Energy supports delegating to states certain authorities of the Administrator over cleanups of federal facilities. In the interest of continuing to move forward, however, this delegation should not slow down on-going cleanups.

Implementation of administrative reforms together with statutory changes to Superfund can increase our program's effectiveness, and save taxpayer money. We cannot get to where we need to be without a team effort that includes regulators and Congress to address the systemic roots of our problems.

We have not, however, been simply waiting for legislative and/or administrative reform. We have sought in conjunction with our regulators and stakeholders to take full advantage of the flexibility inherent in the CERCLA decision process to address our concerns.

We have, for example, worked with our regulators to combine the requirements of the Resource Conservation and Recovery Act (RCRA) and CERCLA essentially under one cleanup program or approach to a site. The purpose of this effort is to provide a framework for implementing program priorities and to institutionalize a site-wide approach for remediation, resulting in little to no duplication of procedures or documentation. We have also identified, at some sites, a lead or single regulator. At Hanford, for example, the proposed concept would eliminate the current support agency role in day-to-day oversight and decisionmaking. These efforts at streamlining the regulatory process as well as respective roles and responsibilities are aimed at making the cleanup process more efficient and cost-effective.

In another attempt to improve our regulatory performance, the Department instituted the concept of "workout" sessions at several DOE sites. These meetings have provided a forum for all involved to identify and address commitments and constraints or potential impediments to getting things done. They also have provided an opportunity to work collaboratively to develop a clear path forward in the current budgetary climate These sessions reflect our focus on how we will mutually resolve the challenges that we face, while at the same time preserving the myriad roles and responsibilities we each have.

In addition, RCRA has allowed the United States to make tremendous progress toward proper waste management and its implementation has minimized the creation of future Superfund sites. However, there is general agreement among the states, the EPA and the regulated community, of which DOE is a part, that some reforms would be beneficial. In an effort to improve RCRA, last year the EPA convened a multi-stakeholder process, which included DOE, to obtain suggestions to improve the hazardous waste management system under RCRA.

During that process, we identified several changes that we believe would be very beneficial. First, we supported changes to facilitate the management of remediation wastes by making the applicable requirements more practical, effective, and cost-reasonable. EPA states and an industry coalition group have been working with Senator Lott's staff to develop a legislative proposal to achieve this goal.

Second, we supported modifications to existing permit requirements to (1) promote the use of mobile treatment technologies for cleanup activities by allowing for multi-site use of such technologies (this would save the high costs of obtaining multiple permits for the same unit and be considerably more expeditious); and (2) allow for the issuance of a single class permit in cases where multiple treatment, storage, or disposal facilities of the same design will be built at the same or different sites. This would avoid redundant permits, necessary costs and delays.

Third, we supported changes that would allow the Administrator to rely on the environmental protection afforded by another Federal statute in lieu of RCRA requirements if the other statutes requirements are protective of human health and the environment.

Finally, we supported the concept advanced by many in the regulated community, that would provide EPA with the flexibility to tailor hazardous waste management requirements to the actual risk posed by management practices for that particular waste. This would avoid costly hazardous waste management requirements that are not necessary to protect human health and the environment. At this time, however, the Administration is only pursuing legislative charges for RCRA in 2 areas: 1) Land Disposal Restrictions for discharacterized wastes and 2) RCRA corrective action (the previously mentioned effort w/Senator Lott). The Administration has not yet made a final decision regarding supporting additional RCRA legislative changes.

GENERAL

Mr. Myers. Last year the conference committee added $60 million to the Environmental Restoration program to accelerate cleanup at sites such as Fernald and Rocky Flats which have developed plans to expedite cleanup and reduce outyear mortgages. We understand that the full $60 million was not allocated to those sites. Please explain why the Department is not putting as much emphasis on accelerated cleanup sites as the Congress directed in fiscal year 1996.

Admiral Guimond. The Department is fully emphasizing accelerated site cleanup and is using the $60 million directed by Congress to expedite cleanup at Fernald, Rocky Flats, and several other Department sites. Additionally, the Department is pursuing a two-pronged approach to accelerating cleanup. This first prong is the outcome oriented National Remedial Action Program strategy. The strategy is designed to accelerate the pace of site restoration, produce tangible cleanup progress, and reduce risk and long-term infrastructure costs associated with the cleanup of the Nation's retired defense nuclear sites and facilities. This accelerated cleanup site strategy is designed to complete remediation of 49 sites in 20 states by the end of year 2000. The second prong is to achieve greater cost efficiency and performance effectiveness generally within the environmental restoration and overall Environmental Management Program. Greater program efficiencies should allow some concomitant acceleration of cleanup activities.

In accordance with the cleanup acceleration criteria provided in the 1996 Defense Authorization Act, DOE developed and implemented a rigorous multi-phase process to identify and support program acceleration opportunities and to distribute the authorized resources in a cost effective manner. Using selection criteria that incorporated the Congressional guidance for accelerating site and facility cleanup, acceleration proposals were solicited from all field offices. These proposals were evaluated, and a consensus among field offices reached as to what projects and activities to accelerate.

This selection process resulted in the allocation of $60M to six field offices to accelerate cleanup activities at a number of Departmental sites. Specifically, the Ohio Field Office was allocated $38.8M to accelerate the cleanup at Fernald, Mound, and the Battelle Columbus King Avenue facility; the Albuquerque Field Office received $9M to accelerate cleanup at the Sandia, New Mexico site; the Kansas City Plant site in Missouri; and the Pinellas, Florida site; the Chicago Field Office was allocated $1.8M for accelerated cleanup activities at Site A, which is a small site located near Chicago, Illinois; the Nevada Field office received $2.9M for accelerated activities at various Nevada small sites; the Oakland Field Office received $2.5M to accelerate the cleanup of the Energy Technology Engineering Center in California; and the Rocky Flats Office received $5M for accelerated cleanup.

Finally, the Conference Committee Report required the Secretary to provide a report to the Congress by May 1, 1996 on each site for which the Department has accelerated the schedule for environmental management activities and projects. This report will fulfill and document the Secretary's full and effective compliance with the Congressional requirements associated with the accelerated cleanup.

GENERAL

Mr. Myers. You have noted that we must rethink the wisdom of attempting to remove all contaminated soil unless it is necessary to protect public health and the environment. Can you expand on this?

Admiral Guimond. The Baseline Environmental Management Report (BEMR) documented, quantified, and communicated the Department's planned approach to remedial actions, which involves relatively little excavation and greater use of capping coupled with land use restrictions. This finding was contrary to generally held opinions that speculated that most sites were being excavated. This opinion proved untrue. This approach continues to guide the cleanup of the Department's contaminated sites and facilities.

Within this framework, the Department's strategy for remediating each site and making it available for beneficial reuse ultimately must adequately address the objective of protecting the safety and health of the public and the environment and reducing life cycle costs. However, the extent to which this objective is achieved, and the cost of conducting remediation activities, depend on both the intended future uses of remediated land and properties, and the standards applicable to the contaminated soils. These are important factors in determining the net benefit to be derived from available remediation alternatives. Many examples exist at Fernald, the Formerly Utilized Sites Remedial Action Program (FUSRAP) and the Uranium Mill Tailings Remedial Actions (UMTRA) sites, and the large sites where a remediation strategy based on the removal of all contaminated soil cannot be justified on the basis of these considerations. The following examples illustrate the reality of optimal rather than pristine cleanup.

The Fernald Environmental Management Project is an example where a balance of on-site disposal and off-site shipment was examined by The Citizens Task Force and the Department for the most cost-effective and risk-effective options. Preferred Comprehensive Environmental Response, Compensation, and Liability Act alternatives were examined and weighed against cost and risk alternatives with accommodations for future industrial land use. Budgets, outyear activities, and cost estimates were then prepared based upon these assumptions, resulting in an optimal site remediation decision to construct an on-site disposal facility.

Many of the FUSRAP, UMTRA, and large sites contain or can be cleaned up to a point where small amounts of contamination which, based on current land use, do not present significant risk to public health and safety. Frequently, environmental concerns are based on the possibility of future redevelopment such as residential/agrarian land use that might result in human exposure from contaminated soils. However, while complete removal of contaminated soils will prevent potential future exposures, such an approach is extremely expensive. In such cases, the optimal approach is one of less pristine cleanup coupled with land use restrictions that protect the public health and the environment. Consideration of this alternative is a fundamental component of the Department's on-going decision process for the site cleanup and reuse.

Such optimal remedial action solutions, based on realistic and responsible land use planning, will enable the Department to reduce the time and cost of remediation, while accelerating cleanup of the sites.

GENERAL

Mr. Myers. Are there sites now where the Department has agreed to remove all contaminated soil which may not be the most cost-effective solution to cleanup?

Admiral Guimond. As noted previously, the Baseline Environmental Management Report (BEMR) shows that many of the Department's past, current, and future remedies involve capping or in situ stabilization. It is much less common for a remedy to require removal of all contaminated soil.

Remediation decisions are based on consideration of many factors including risk, mortgage reduction, stakeholder concerns, future land use, cost, and a variety of other concerns.

Working with regulators and site specific advisory boards, DOE is making significant progress in implementing more risk-based, cost-effective remedial actions. A recent example of this kind of a very successful interaction is the agreement with the local community and regulators which will significantly accelerate the cleanup of Fernald and save about $2 billion.

However, there are some instances in which the ultimate remedy selected may not have been the most cost effective for various reasons. An example of this is at the East Mesa Geothermal Test Facility located near El Centro, CA. In this case, the California Regional Water Quality Board has issued a cleanup order to remove and dispose of 12,000 cubic yards (860 truck loads) of brine holding pond residue contaminated sand. The less costly alternative is site regrading.

As noted earlier, as we get greater involvement of regulators and other stakeholders in our decision making, we are more likely to avoid these sorts of situations and adopt more cost effective remediation solutions.

GENERAL

Mr. Myers. The National Research Council in its report, "Barriers to Science," concluded that a fundamental obstacle to progress in the environmental remediation program is not technical, but organizational. The committee noted that the problem manifests itself in many different ways, but there was a common problem: "What happens is driven too often by the internal needs of the organizations charged with the remediation work rather than by the overall goal of environmental remediation." How would you respond to this criticism, and what steps have you taken to resolve the problem?

Admiral Guimond. The Secretary, very early in her tenure, recognized a number of interrelated weaknesses within the Department, including: (1) program goals were not well defined and articulated; (2) Department and contractor organizations were not aligned with program goals; and (3) contracting practices did not focus attention on the Department's goals. At his confirmation hearings as the Assistant Secretary for Environmental Management in early 1993, Tom Grumbly (now Acting Under Secretary) sought to address these weaknesses in part when he set forth six goals for the EM organization, including "being more outcome oriented," and "focusing on tangible results."

The current budgetary outlook, combined with stakeholder expectations, Congressional directives, and external oversight, have led EM to refocus and improve the management of the program to ensure that EM can accomplish its mission in the most safe, efficient, and cost-effective manner. By adopting a performance-based management system, EM Headquarters, field sites, and contractors are changing the way of doing business to efficiently achieve the goal of environmental cleanup and thereby provide a worthwhile return on the taxpayers' investment.

The NAS report is based on a series of snapshots of the program, taken over a period of several years. Since the NAS made its observations, EM has continued to implement innovative approaches to ensure that environmental cleanup is the major program focus. I would like to provide those approaches for the record.

EM INITIATIVES

- Developed the Baseline Environmental Management Report to accurately lay out program mission and objectives, as well as estimate the costs to achieve cleanup.
- Defined the roles, responsibilities, and authorities for headquarters and field organizations, consistent with the Environmental Management Strategic Plan, the Department's first.
- Revised and streamlined EM procedures to effect necessary, permanent, and positive changes, - e.g., uniform program and program execution guidance from headquarters to the field. This improved communication and direction is intended to ensure program execution by the field that is consistent with national program commitments to stakeholders.
- Increased involvement of stakeholders in program decision-making to ensure the activities undertaken will be acceptable to the regulators and the public. As a result, eleven sites across the complex now have Site-Specific Advisory Boards (SSAB),

which provide input on cleanup activities, future land-use, budget, and other decisions at the site level, all of which contribute to our focus on the goal of environmental cleanup.

- Participated in numerous information exchange and benchmarking activities to ensure that lessons learned, both internal and external to the program, are communicated and applied.
- Formed the Environmental Management Advisory Board, made up of individuals from outside the Department, to provide advice, critiques, and recommendations for improving the way EM does business. Our continued interfaces with this Board provide a mechanism to review the Environmental Management program to ensure objectives, plans and activities are all focussed on maximizing cleanup results.

EM and Departmental management intend to remain vigilant, and to continue to encourage innovative approaches to complete the mission of the EM program.
Some evidence that we are succeeding in our efforts is revealed in the National Academy of Science's most recent report titled Improving the Environment: An Evaluation of DOE's Environmental Management Program, that [a] "number of [EM's] initiatives are rapidly introducing change into a system that was established during the Cold War ... [EM's] principles and general direction are encouraging."

GENERAL

Mr. Myers. One of the Department's contractors has expressed concern that they can't seem to get DOE headquarters really interested in accelerating cleanup. Our concern is that if the Department is not interested in breaking the existing mold for cleaning up facilities, the new contractors who have been brought in will get tired of fighting the internal DOE bureaucracy, lose interest, and pull their best people from the projects. How do you propose to prevent this?

Admiral Guimond. Notwithstanding the view of the contractor, the Department is committed to accelerating cleanup and is aggressively carrying out activities to ensure progress in achieving this goal. In 1995, the Department of Energy's Office of Environmental Restoration, within the Office of Environmental Management, developed an outcome oriented National Remedial Action Program strategy designed to accelerate the pace of site restoration, produce tangible cleanup progress, make land available for return to the public earlier than originally scheduled, and reduce risk and long-term infrastructure costs associated with the cleanup of the Nation's retired defense nuclear sites and facilities. The strategy has two complementary facets: accelerating cleanup activities that produce significant positive impacts on the program's technical scope, schedule, and cost; and activities that permit us to "do more with less" through program efficiency improvements. Our "accelerated cleanup site strategy", developed in the spirit of the Government Performance and Results Act, is designed to complete remediation of 49 sites in 20 states by the end of year 2000.

The broad strategy for carrying out the Office of Environmental Restoration mission is to accelerate remediation completions at small sites (including Former Utilized Sites Remedial Action Program (FUSRAP) and Uranium Mill Tailings Remedial Action Program (UMTRAP), address the highest risks first at large sites, and complete decommissioning. This program is already producing tangible results. Through FY 1995, a total of 136 buildings were completed within the Large Sites Decommissioning Program, including the accelerated cleanup activities at Mound and Fernald; surface remediation at 15 of the 24 UMTRA sites was complete; remediation of over 4,800 UMTRA vicinity properties have been completed; and restoration of 21 of the 46 FUSRAP sites and 180 vicinity properties have been completed. More recently, the Congress, through the FY 1996 National Defense Authorization Act, has supported our acceleration strategy by providing $60M for 40 accelerated cleanup activities at 14 geographical sites in 9 states. We expect this Congressional investment in our acceleration strategy will reduce cleanup schedules by an average of one year.

The Environmental Restoration Program has a proven record of recognizing the need for, developing, and implementing innovative and effective management processes for continuously improving program performance. Previous efforts to "projectize" all program activities, reduce costs through benchmarking, and focus on tangible outcomes through performance plans and metrics have demonstrated a degree of management vision, commitment, and control that is not common in other programs of similar scope, complexity and magnitude. Today, embedded within all national and site-specific EM planning initiatives are efforts to complete remediation, reduce overall costs, and accelerate progress where possible. The Congressional authorization for accelerating Environmental Management cleanup activities represents an important investment in the program that has already paid dividends. DOE plans to continue to demonstrate the significant benefits of an accelerated program. In turn, Congress' endorsement of this effort is and can continue to make an important contribution to changing the culture of the program to one that is focused on performance, outcomes, and program efficiencies

The Department's accelerated cleanup strategy for Rocky Flats was developed in March 1995 as part of the Environmental Restoration Strategic Plan. The first public presentation of this strategy was at the ER'95 Conference held in Denver, Colorado in August 1995. Thus, it is understandable that our commitment to accelerated cleanup has not yet been effectively communicated to all our stakeholders. We intend to continue to communicate our accelerated cleanup strategy through our actions and our words. Attracting and retaining the most talented contractors is vitally important to our ability to successfully execute our acceleration strategy.

GENERAL

Mr. Myers. A recent report by the National Research Council, "Improving the Environment," recommended that DOE implement a broad-based system of external peer review to ensure that the best research and development proposals are selected, and that technology development needs to be intimately linked with user and site needs. The peer review process is being used in the $50 million environmental science and research program, but how is external peer review accomplished for the remaining funding in technology development?

Admiral Guimond. There are presently two levels of peer review of the technology development activities: 1.) Departmental level reviews by the National Academy of Sciences, the Environmental Management Advisory Board and Site Specific Advisory Boards; and 2.) Project level reviews by technical reviewers for the five focus areas that Environmental Management has established as primary problem areas as well as crosscutting programs that support the focus areas.

Through the National Academy of Sciences, the National Research Council established a multi-disciplinary committee of experts in appropriate fields to provide an independent review of the environmental technology development activities. This committee, Committee on Environmental Management Technologies (CEMT), reviews on a continuing basis the adequacy, quality, scientific basis, effectiveness and relevance of Environmental Management's technology development programs.

An example of the project level peer review is the November 1995 review of all thermal treatment technologies applicable to transuranic, transuranic mixed, and mixed low-level waste types. These thermal technologies were reviewed by two separate panels consisting of 1.) national and international experts in the fields of glass and ceramic chemistry/engineering, air pollution control, geology/geochemistry, and nuclear physics, with no connections to DOE activities; and 2.) DOE representatives from each of the six major sites having the majority of the targeted wastes. The results from this review were also peer reviewed. Another similar peer review was conducted in January 1995 on non-destructive assay and non-destructive examination technologies applicable to the large volume of containerized mixed and retrieved buried waste throughout the DOE complex. Conclusions included prioritized lists of management and technical tasks and recommendations on which technologies warrant continuation or discontinuation of development.

Also, a system for the review of technologies in accordance with maturity levels based on criteria established with the customer is being develop. It is anticipated that this will be adopted as a programmatic level of peer review that will link the two review levels.

GENERAL

Mr. Myers. The National Research Council also recommended that other Department programs "pay" Environmental Management for managing and disposing of waste as an incentive for waste minimization. What steps have been taken to implement this proposal?

Admiral Guimond. The NAS/NRC Report "Improving the Environment: An Evaluation of DOE's Environmental Management Program" refers repeatedly to incorporating full life-cycle costs of waste management into DOE's internal decision making. The question refers to a proposal that generators "pay the Environmental Management organization for managing and disposing of waste as an incentive for waste minimization." While waste minimization sets a goal of having generators ultimately internalize the true life-cycle costs of waste they generate, DOE believes that the ultimate goal of the NAS/NRC recommendation is to incorporate sound economic incentives into DOE decision-making.

Environmental Management (EM) has been studying not only the NAS/NRC recommendations, but also an earlier, similar recommendation by the Environmental Management Advisory Board (EMAB) and the work of DOE's internal Waste Management Alternative Working Group (WMAWG). While EM and DOE have taken no formal position on charging the full life-cycle costs to waste generators for treatment, storage, and disposal of various types of waste, EM is currently piloting other generator programs at the Sandia (NM) and Los Alamos National Laboratories, along with the Oak Ridge and Savannah River Operations Offices. Moreover, EM supports, in principle, the idea that actions should be directly linked to consequences, in this case, costs, and that those costs be borne by the decision-maker.

If EM recommends that DOE incorporate both life-cycle costing and changes in the cost/accountability structure, we would report to the Congress on the need and basis for such action and any related changes to appropriations and authorization statutes.

GENERAL

Mr. Myers. It is often difficult in Congress to maintain support for programs which have deadlines for completion of 50 to 75 years from now like this cleanup program. It is also apparent that substantial amounts of funding are focused on programs and problems which may not be the highest priority cleanup actions from a public health and safety perspective. Would it be possible to solve the most critical cleanup problem throughout the complex within the next five years at current funding levels with a more focused program ? What would it take to structure a program that would immediately address the most critical issues with that type of deadline?

Admiral Guimond. Completely solving the most critical problems throughout the complex within the next five years cannot be accomplished with more focussed use of existing funding levels. Nonetheless, the Department is now focusing its Environmental Management resources in order to address the most urgent risks and substantially reduce the mortgage costs. We agree with the suggestion implicit in the question that our goal should be to seek completion of as much of the program as soon as possible - especially the urgent risks and those problems that are costing a lot of money merely to maintain and prevent accidents. We would like to eliminate as much of the potential risks as possible so as to complete work at as many sites as possible. "Complete" in this case means to greatly reduce the risks and the costs at the sites, thereby making the site available for alternative future land use, and reducing the government's responsibilities to long term surveillance and maintenance.

We understand the problem of maintaining momentum for goals that are 50-75 years into the future; the same problem affects those who work in the field day-to-day, and require some satification from seeing progress towards an attainable goal. There are two solutions. First, we have dramatically shortened the completion dates from those projected last year, which were cited in the question. The 1996 Baseline Environmental Management Report (BEMR) will illustrate substantially shorter time horizons for many of the sites, and significantly lower cost projections. Much of this change results from changes in the technical scope, or approach that allow the Department to achieve the same risk reduction goals through more economical remedies, which have been developed in consultation with regulators and other stakeholders. Second, we have identified a variety of near term high priority goals, such as mitigating urgent risks (e.g., unstable plutonium and tanks) and reducing mortgage costs (e.g., PUREX plant stabilization).

Despite this increased focus on urgent risks and reducing costs, it is not possible or prudent to ignore the many lower risk but chronic problems that exist at many sites. It is necessary to whittle them away in a reasonable manner by focussing initially on those for which efficient technologies exist and those for which a near term alternative future land use exists.

Addressing the most critical issues in a rational manner would be greatly facilitated if Congress would enact the Administration's Superfund reform amendments.

GENERAL

Mr. Myers. Are you currently maintaining a complete inventory of DOE cleanup sites that describes the level and type of contamination, the status of cleanup activities, and other information which will be useful in determining future and final use of the sites ?

Admiral Guimond. We have established some information basis for tracking progress and contamination, described below. We have not however, assembled an integrated information system that can provide long-term tracking, mapping and reporting of the condition of all of the Department's Environmental Management sites. Like the *Baseline Environmental management Report*, which provided a useful benchmark to measure our progress on life-cycle cost reduction, a resource of this kind would serve as an authoritative management "yardstick" for measuring progress toward the goal of completing the Environmental Management program. That goal is to reduce the risk and cost at the sites sufficiently so that the only tasks remaining are long-term surveillance and maintenance. Following completion of this mission, this information would support the determination of future and final use of the sites and the establishment and use of effective long-term institutional controls on the many sites which will require land-use restrictions or long-term surveillance and maintenance.

The Department is still in the process of characterizing and quantifying its environmental legacy. This legacy has four basic elements: wastes (such as high-level and transuranic wastes), contaminated environmental media (e.g. soil and groundwater), excess facilities, and a new category of non-waste "materials in inventory," such as spent nuclear fuel, nuclear fuel, nuclear materials and scrap metal.

Waste: An inventory of DOE wastes is now available in two annually updated reports: (1) *Integrated Database of Radioactive Wastes and Spent Nuclear Fuel* (IDB); and (2) the *Mixed Waste Inventory Report* (MWIR). Low-level wastes and hazardous wastes are routinely disposed of by the DOE complex. The Department is actively pursuing the establishment of repositories for high-level and transuranic wastes.

Environmental Media The Office of Environmental Restoration maintains a working database of summary information about each release site. To date, about 50 percent of over 8,700 potential contaminated release sites at major DOE sites have been characterized. Over 2,600 of these sites have been completed. Surface remediation has been completed at 15 of the 24 Uranium Mill Tailings Remedial Action (UMTRA) program sites and 21 of the 46 Formerly Used Site Remedial Action program (FUSRAP) sites. Over 5,600 of the 6,000 vicinity properties have also been completed. The Environmental Restoration program has also decontaminated and decommissioned about 200 of over 1,000 facilities scheduled.

Excess Facilities: The 1992 *Surplus Facilities Inventory Assessment* assembled the first comprehensive look at the Department's legacy of excess facilities that require characterization and, in many cases, deactivation, decontamination or dismantlement. The Office of Field Management maintains the related Facility Information Management System. The Department has identified well over 20,000 facilities ranging from large reactors and chemical processing plants to guard shacks and office trailers. Of these, the Department has determined that approximately 4,100 are surplus. This includes nearly 600 abandoned facilities, over 1,200 shut down and over 400 on standby. So far, over 130 facilities have been deactivated and over 400 have been decontaminated and decommissioned.

Materials in Inventory: A recent DOE-wide Material in Inventory (MIN) Initiative has laid the foundation for a comprehensive assessment of materials which are no longer in use by DOE programs. The Initiative's report, *Taking Stock*, is scheduled to be issued in the Spring of 1996. The MIN Initiative identified over 800,000 tons of material in ten different categories which are not in use by DOE. Many of these materials, such as spent nuclear fuel and excess fissile materials, present complex disposition and management issues which are in the process of being resolved.

These resources contain a considerable amount of information on the current state of the Department's environmental legacy. However, these data resources were assembled and structured in different ways for different purposes. As a result, they often contain only partial information on the Department's environmental legacy. For example, the Environmental Restoration database is used to plan and manage remediation activities. As a result, it does not include information on release sites where no further action is possible or planned but which need to be tracked for the long term. There is a great deal of additional information at the site and Operations Office levels but it has not been collected or integrated at the Headquarters level.

GENERAL

Mr. Myers. One of the keys to reducing cleanup costs appears to be early determination of the end use of the land so you can decide up front how much cleanup is necessary. GAO has indicated that incorporating more realistic land use assumptions into the selection process for a cleanup remedy could result in cost savings of up to $600 million annually. What progress is being made by the Department to focus on ultimate land use issues before cleanup commitments are made?

Admiral Guimond. The Department has made significant progress in factoring in ultimate land use before cleanup commitments are made. Several sites have already changed the projected remedy, based on realistic future land use, resulting in savings of billions of dollars. All sites have involved stakeholders in discussions of specific remedies as required by CERCLA and RCRA. To address site-wide visions for the future and how specific contamination problems and remedies will fit into a comprehensive site remediation plan, working groups have begun meeting at many sites to discuss future uses. The Department also is drafting a *Future Use Report* to be published in April 1996, to provide a guide to sites on future options and related use recommendations by stakeholders. The Environmental Management program intends to use these recommendations to formulate site-specific restoration plans as early in the remediation process as possible.

Wise application of future land use assumptions in conducting cleanup can generate dramatic annual cost savings over the life cycle of the program. That is precisely why the Department initiated future use planning and dialogue with the community stakeholders who have the long term interest in the disposition of these sites. Community acceptance of the final remedy is as equally important as any other element of the Record of Decision that charts the course of cleanup. If the Department chooses cleanup remedies that are counter to the safety, health, economic, and cultural needs and desires of community neighbors impacted by our decisions we have failed in our mission. The publication in 1995 of site specific future use plans, that were derived from a collaborative effort among site personnel, community elected officials, local business leaders, and concerned citizens, has provided the Department a very powerful articulation of where those long term interests are.

An example of savings that have been realized from tailoring cleanup goals to land use plans in close coordination with stakeholders is the Fernald site cleanup. Incorporation of future use agreements to designate the site for industrial and recreational uses resulted in a projected $1 billion savings. Previously, cleanup goals were geared toward residential and agricultural uses in the absence of a definitive plan.

Additionally, the Department has moved much farther down the path of identifying for our own purposes, our future land use needs as we continue the transition from our Cold War mission. By looking at Department lands and facilities in the larger scheme of a corporate Life Cycle Asset Management strategy we are better able to define our needs into the future and incorporate these needs in cleanup planning and commitments. In anticipation of the need to provide indefinite institutional controls to facilitate future land use of sites where contaminants are stabilized but not removed entirely, the Department is now developing a land, facilities, and materials tracking system, which will also facilitate tracking and encouraging progress.

GENERAL

Mr. Myers. Your statement notes that the Nuclear Materials and Facility Stabilization program is the fastest growing program within the Office of Environmental Management. It also has the largest costs for simply maintaining materials and facilities in place while making little progress to accelerate decontamination and decommissioning which will reduce future costs for surveillance and maintenance. What steps are you taking to substantially increases the rate at which facilities maintenance costs are reduced?

Admiral Guimond. Reducing mortgages is one of the highest priorities in the program. While surveillance and maintenance (S&M) comprises a significant portion of the budget, the Office of Nuclear Materials and Facility Stabilization (NMFS) FY 1997 budget request reflects a 15 percent ($90M) decrease for S&M activities and concurrently, we are requesting 34 percent ($51M) more for stabilization and deactivation activities.

S&M costs represent a "mortgage" which is largely a cost associated with managing potential hazards resulting from the presence of radioactive and hazardous materials in a facility. The majority of mortgage reduction will result from stabilization and deactivation activities. This is achieved by reducing material and facility risks and hazards to the public, workers, and the environment by placing the materials and facilities in a safe, stable condition. Once the hazards associated with the materials and facilities are mitigated, S&M costs for maintaining the facilities will be significantly reduced, lowering the "mortgage." For example, at the B Plant in Hanford, Washington, S&M costs will be reduced from $33M annually to less than $1M after stabilization and deactivation activities are completed.

NMFS is currently focusing on determining the necessary and sufficient set of S&M activities to maintain a safe, reliable, efficient and cost-effective operating envelope while retaining the capability to support stabilization and deactivation work. Along with defining the minimum set of S&M activities needed, we are also working to make sure each necessary activity is conducted at the lowest reasonable cost. Key activities to achieve S&M cost efficiencies include establishing and implementing performance measures for S&M and benchmarking these activities against industry standards. By establishing new performance measures and management systems we should reduce and/or eliminate the redundant and excess costs associated with S&M activities.

GENERAL

Mr. Myers. This program is proposing to fund 3,128 federal employees to manage this program in fiscal year 1997, and 618 of them are in the Washington headquarters office. Assuming that headquarters provides policy guidance and upper management oversight of field activities where the cleanup is actually performed, what possible use can you have for over 600 employees at headquarters?

Admiral Guimond. The Environmental Management (EM) program is the largest environmental stewardship program in the world. We have sites in more than a dozen states, with thousands of contaminated areas and buildings huge waste volumes, and tons of nuclear materials that require stabilization and safeguards. Last year, the EM program estimated the cost for stabilizing and cleaning up these facilities to be approximately $200 billion with a range of $170 billion to $350 billion, depending on the expected future land use and project efficiency.

This challenge requires a coordinated effort across our sites to develop and share cost-effective technologies, ensure best management practices, and accomplish our diverse tasks in the smartest, most cost-efficient manner possible. The field organizations implement policy and manage the daily activities at sites. The primary role of Headquarters is to direct and coordinate the entire EM program from a national perspective. This national programmatic responsibility includes setting national goals and priorities; ensuring consistency and avoiding duplication among the sites; developing the EM overall budget for the sites to ensure an appropriate balance between national and local goals and priorities; developing positions and comments on proposed environmental legislation and rules that would affect site activities, coordinating waste transportation and negotiaing shipping rates; and measuring the performance and cost-effectiveness of field and Headquarters organizations to improve the overall program.

Headquarters initiatives have fundamentally improved the EM program in recent years. Headquarters initiatives have integrated information about risks to public health, worker safety, and the environment into the budget formulation process for the sites; reformed the way contracts are written and awarded at our sites to ensure long-term and systemic improvement in productivity through performance measures and incentives; and establishd performance standards and measures for the EM sites.

As the responsibilities of the EM program have shifted and increased over the last few years, the EM program has worked to delineate clearly the roles of Headquarters and the field and to achieve an appropriate balance of employees at both levels. More specifically, the EM program has in recent years delegated increasing authority to the sites for site budgets and activity management. Additionally, we have emphasized the need in all of our activities -- both at Headquarters and in the Field -- to "do more with less." Accordingly, in our September 1994 streamlining plan for the National Performance Review, EM set a goal of 531 Headquarters positions by the end of FY 1999. The Secretary of Energy's Strategic Alignment Initiative reinforced our own streamlining plans by giving us a target of approximately 500 positions by FY 2000. We are working to accomplish these reductions in an appropriate and balanced fashion though attrition, retirements, and transfer to the field.

GENERAL

Mr. Myers. The Environmental Research Technology Group (ETRG) from the Bureau of Mines was transferred to the Environmental Management Program. Please explain why the Environmental Management Program needs another field office. Please describe the types of environmental research which this group has performed, how that research is applicable to current needs, what new technical expertise they bring to the process, number of FTEs, and total annual cost of facility operations.

Admiral Guimond. The Environmental Technology Research Group has a staff of 29, comprised of 20 professional scientists and engineers supported by technicians and office staff. It is a small component of the U.S. Department of Interior, Bureau of Mines functions that were transferred to the Department of Energy Fossil Energy program in FY 1996, along with 527 FTEs. The ETRG does not constitute a field office, but is a mine waste oriented environmental research organization. The group has both laboratory and field capabilities, site characterization and groundwater monitoring experience and general water treatment capabilities. Examples of the Group's capabilities include:

- Application of in-line aeration and treatment to EM wastewater treatment requirements
- Application of bacterial sulfate reduction to the treatment of hazardous waste sites
- Subsurface diagnostics for hazardous waste sites
- Site characterization of hydraulic and geochemical regimes

The appropriate disposition of ETRG functions and staff within the Department has not yet been determined.

GENERAL

Mr. Myers. The design, engineering, construction and project management costs associated with line item construction projects appear exorbitant. They consistently exceed 25% of the actual construction costs. Why are your project management costs so high? What steps are you taking to reduce these costs?

Admiral Guimond. In December 1995, the Office of Waste Management (WM) asked Independent Project Analysis, Inc. (IPA) to examine and provide industry ranges for major cost components of the total installed cost of a new process unit or facility. IPA's database of private sector projects shows that the mean value for design, engineering, construction, and project management represents 30% of the total project cost. Based on analysis by the Office of Environmental Management (EM) and supported by the November 1993 IPA Project Performance Study, several causative factors were identified for the costs associated with Environmental Restoration (ER) and WM projects being considerably higher than similar projects in the private sector. These factors centered around lack of sufficient up-front definition of project requirements, schedules that are too long, contracting strategies that rely too heavily on cost-plus contracts and multiple prime contractors, and often redundant regulatory requirements not normally found in the private sector. Although we have made major strides in identifying the causes for overruns associated with specific line item construction projects and instituting changes to bring costs down, more work is necessary and ongoing.

Although EM project management costs are still higher than the private sector and other government agencies, we have made significant improvements that are closer to what others are achieving. The 1993 IPA benchmarking study indicated that EM projects averaged 22% of total costs while the average for private sector projects averaged 6% and the government average was 9%. This higher average in EM lead to a significant effort by EM to focus on reducing not only our project management costs but all our costs to perform our work. Another IPA study was completed in March 1996 to help determine if progress has been made and where we need more attention. This most recent study, focused on environmental restoration, found that current project management costs average 16% which is still higher than the private sector but, by dropping from 23% two years ago, is a significant improvement. We still recognize that we have further to go and are continuing to focus on this through the increased use of benchmarks, performance measures, and management attention.

In the area of contracting, we have adopted a series of contract reform initiatives to move away from the standard Maintenance and Operations (M&O) contractor approach utilized during the Cold War. Contracts at our sites are being competed and, wherever possible, the contracting strategy focuses on incentive based and fixed price contracts. Privatization of projects such as the Hanford waste tanks are also expected to save potentially hundreds of millions of dollars.

We have also completed a WM Project Performance Analysis to assist our efforts to get these costs under control. The March 1996 EM Project Performance Analysis effort measured progress since the "EM Stand Down" and will assist us in determining where additional work must be completed to drive costs even lower. This latest IPA analysis reviewed 48 ERWM projects that: 1) were initiated since the Stand Down and are at least through the conceptual design stage; 2) were not included in the November 1993 IPA study or the Waste Management Project Performance Analysis; 3) have total project costs in the range of $5 million; and 4) are representative of the DOE sites. The final report of this analysis will be completed by the end of April 1996. We will forward the results of this analysis to the committee upon completion.

In order to improve up-front definition of project requirements and reduce or eliminate redundant Departmental requirements, EM was an active participant in the consolidation and revision of several DOE Orders. The result was DOE Order 430.1 Life Cycle Asset Management Plan (LCAM). Major requirements of this order include clear and detailed up-front analysis of the need for and requirements of construction projects. Additionally, the EM Project Definition Handbook and the Supplemental Joint Program Direction on Project Management were developed and issued to further elucidate the level of up-front definition required for new line item construction. For those smaller scale projects not requiring EM approval prior to construction, the site contractors are now required to demonstrate the need for construction based on EM's Validation Checklist.

GENERAL

Mr. Myers. By site and program identify and describe all economic development funding included in fiscal years 1995, 1996, and 1997.

Admiral Guimond. The funds provided to various sites for economic development activities through January 1996 are provided in the attached chart. The chart provides a brief description of each funded activity. The Department will be evaluating additional economic development proposals for fiscal year 1996 and based on the merits of the proposals will fund them accordingly with available funds from the Office of Worker and Community Transition.

One specific project, the National Conversion Pilot Project (NCPP), funded through our Rocky Flats Field Office, will use fiscal year 1996 funding from both the Office of Environmental Management and Office of Worker and Community Transition. Environmental Management will provide a total of $5M to conduct NCPP non-economic development activities, including deactivation and decontamination, in the NCPP buildings, particularly Building 883. Worker and Community Transition will provide a total of $5M to conduct NCPP economic development activities, including equipment refurbishment and process verification. This teaming will allow the builiding to be cleaned up earlier and allow for an alternative use to recycle the contaminated materials to make containers to dispose of low level wastes from Rocky Flats. Not funding the NCPP could substantially reduce DOE effectiveness in the privatization arena; continue surveillance and maintenance costs in the NCPP buildings; would not reduce health and safety risks of plant workers from exposure to beryllium and depleted uranium in the building; and may result in added disposal costs to build new uncontaminated disposal containers.

For fiscal year 1997, the Office of Environmental Management has no funding identified for economic development activities, consistent with direction provided in the Energy and Water Development House Conference Report dated October 26, 1995. The Department will be evaluating potential economic development activities for fiscal year 1997 and will provide you with information when it is available.

GENERAL

Mr. Myers. How is each DOE site funding economic development activities in fiscal year 1997?

Admiral Guimond. All funding for economic development activities in fiscal year 1997 will be provided from the Office of Worker and Community Transition budget appropriation.

GENERAL

Mr. Myers. Do any of the DOE sites fund economic development activities through overhead accounts? If so, please describe.

Admiral Guimond. The Energy and Water Development House Conference Report dated October 26, 1995 specifically prohibited the use of Environmental Management appropriations to fund economic development activities. The Office of Environmental Management reemphasized this guidance in a memorandum to the field dated February 21, 1996. Consistent with the conference report language, we are not aware of any DOE site that is funding economic development activities through overhead accounts.

FUNDING FOR STATES AND TRIBES AND LOCALITIES

Mr. Myers. It is difficult to determine exactly how much funding is being provided to States, tribes, and localities throughout this program. Please identify by program all funding provided to each of these entities for activities such as monitoring, oversight compliance activities, impact assistance, or agreements in principle.

Admiral Guimond. A summary of the Department's Office of Environmental Management funding estimates for state and tribal monitoring, oversight, compliance activities, and impact assistance activities is provided in the attached tables. The tables include the Department's funding estimates for tribal activities that allow Tribal governments to fund core environmental management programs and build technical and scientific capability. The first table includes funding information for Fiscal Years 1994, 1995 and 1996. We have not yet established a complete budget for FY97. The tables also represent funding summaries for state impact assistance including: (1) transportation planning related to the Department's shipment of hazardous and radioactive materials; (2) the Rocky Flats surface water management project providing additional protection to surface waters from potentially contamination run-off from the Rocky Flats Plant; (3) the Western Governor's Association activities coordinating states' activities associated with the Department's Waste Isolation Pilot Project (WIPP). The tables include funding summaries for state support and planning for compliance activities including; (1) technical document review for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) activities; and (2) state resource funding for the Federal Facility Compliance Act planning provided through the National Governor's Association. Tables attached also include funding summaries for: (1) oversight, monitoring, and public participation activities by states though the Department's Agreement-in-Principle program; (2)through a series of oversight and monitoring grants for the Hanford site; (3) and a public participation grant for the State of Oregon. Funding estimates do not reflect the actual rate of state and tribal expenditures for program activities. Federal cooperative agreements and grants used to fund state activities require the states to report on all federal funding received. However, states may pass funds on to localities to support these activities but this funding allocation is tracked on the state level and is not available to the Department.

OFFICE OF ENVIRONMENTAL MANAGEMENT (EM)
SUMMARY OF FUNDING
FOR INDIAN TRIBES*
(April 1996)

SITE	FY 94	FY 95	FY 96
Umatilla/Hanford-EM Planning* **	1,220,000	2,053,000	1,417,000
Shoshone-Bannock Indian Tribes/INEL-EM Planning* **	600,000	800,000	1,000,000
Yakama/Hanford-EM Planning**	1,400,000	1,920,000	1,410,000
San Ildefonso Pueblo	233,000	0	426,000
Nez Perce/Hanford-EM Planning	1,101,000	1,540,000	1,080,000
Santa Clara Pueblo******	0	400,000	429,000
Cochiti Pueblo******	0	480,745	580,000
Jemez Pueblo******	0	252,963	300,000
Seneca	0	0	100,000

* Funding provided through EM Organizations is represented by:
FY 94 Funds are from #1 Office of Planning and Resource Management;
FY 95-96 Funding provided by the Office of Intergovernmental and Public Accountability;#2 Office of Environmental Restoration and #3 Office of Nuclear Materials and Facilities Stabilization.

** FY 94 Funding represents 20% of Tribal funding by the Office of Environmental Restoration; 80% funding provided by the Office of Nuclear Materials and Facilities Stabilization; FY 95-96 Funding provided by the Office of Intergovernmental and Public Accountability.

*** FY 95-96 Consolidates EM funding and WIPP-related activities.

**** The Office of Environmental Management and the Office of Defense Programs (DP) will co-fund FY 96 funding of cooperative agreements. EM funding is $985,000. DP funding is $750,000. Total funding for the four Pueblos is 1.735 million.

OFFICE OF ENVIRONMENTAL MANAGEMENT
SUMMARY OF FUNDING ESTIMATES FOR TRANSPORTATION PLANNING FOR HAZARDOUS/RADIOACTIVE MATERIAL SHIPMENT AND WATER MANAGEMENT PROJECTS*
(April 1996)

ORGANIZATION	FY 95	FY 96	FY 97
URBAN ENERGY TRANSPORTATION CORP.	300,000	300,000	300,000
TRANSPORTATION EMERGENCY PREPAREDNESS EXTERNAL COORDINATION GROUP	400,000	400,000	400,000
ROCKY FLATS SURFACE WATER MANAGEMENT	12,000,000		

* Funding provided through the Office of Environmental Restoration.

OFFICE OF ENVIRONMENTAL MANAGEMENT (EM)
SUMMARY OF FUNDING ESTIMATES FOR TECHNICAL ASSISTANCE TO STATES*
(April 1996)

ORGANIZATION	FY 95	FY 96	FY 97
LOW LEVEL WASTE FORUM	630,000	660,000	660,000

* Funding is provided to States' organization representing compacts. Funding is provided by the Office of Waste Management. Current budget period continues through the end of FY 96. A new agreement will need to be negotiated.

OFFICE OF ENVIRONMENTAL MANAGEMENT (EM)
SUMMARY OF FUNDING ESTIMATES FOR THE WASTE ISOLATION PLANT AND RELATED ACTIVITIES
(April 1996)

GROUP	FY 95	FY 96	FY 97
WGA Administration	103,000	96,000	205,000
COLORADO		225,000	225,000
IDAHO		225,000	225,000
NEW MEXICO		10,000	10,000
UTAH		100,000	150,000
WYOMING		109,000	190,000
CALIFORNIA		5,000	5,000
ARIZONA		5,000	5,000
NEVADA		5,000	5,000
WASHINGTON		50,000	50,000
OREGON		50,000	50,000
NEBRASKA		5,000	5,000
WESTERN GOVERNORS ASSOCIATION (5YR TOTAL)**	103,000	735,000	1,125,000
SOUTHERN STATES ENERGY BOARD	105,000	111,000	130,000
WIPP COOPERATIVE AGREEMENT	371,000	700,000	1,100,000
CARLSBAD ENVIRONMENTAL MONITORING AND RESEARCH CENTER (CERMC)**		1,731,000	4,500,000
NEW MEXICO STATE ASSISTANCE*	20,000,000	0	0

* Funding in the amount of $20 million from FY 92 appropriations was provided to the State of New Mexico in FY 95 when the WIPP met the requirements of the Land Withdrawal Act after DOE submitted the draft Compliance Certification Application. Payments to the State will not begin until waste is received at the site

** Carryover funds from prior years have been used for WGA and CERMC for FY 95

OFFICE OF ENVIRONMENTAL MANAGEMENT (EM)
SUMMARY OF CERCLA INTERAGENCY AGREEMENT FUNDING ESTIMATES FOR OVERSIGHT OF SITE CLEANUP*

(April 1996)

SITE/STATE	FY 95	FY 96	FY 97
OAK RIDGE RESERVATION/TENNESSEE	1,228,779	1,277,930	1,329,047
IDAHO NATIONAL ENGINEERING LABORATORY/IDAHO	2,128,000	1,635,000	1,716,000
HANFORD/WASHINGTON	2,710,000	2,500,000	2,700,000
FERNALD/OHIO	2,800,000	2,123,000	2,143,786
MOUND PLANT/OHIO	1,131,000	1,230,000	1,292,000
ROCKY FLATS PROJECT/COLORADO	500,000	500,000	500,000
NEVADA TEST SITE/NEVADA	600,000	600,000	700,000
LAWRENCE LIVERMORE NATIONAL LAB MAIN SITE/CALIFORNIA	315,000	315,000	200,000
LAWRENCE LIVERMORE NATIONAL LAB SITE 300/CALIFORNIA	310,000	310,000	194,000
SAVANNAH RIVER SITE/SOUTH CAROLINA	885,500	1,495,000	1,420,000
BROOKHAVEN NATIONAL LAB/NEW YORK	150,000	300,000	500,000
WELDON SPRING/MISSOURI	510,000	500,000	500,000
MONTICELLO MILL SITE/UTAH	200,000	150,000	150,000
PROJECT CHARIOT/ALASKA**		700,000	

* Funding provided through the Office of Environmental Restoration

** One-time payment in FY 96 for a community grant

OFFICE OF ENVIRONMENTAL MANAGEMENT (EM)
SUMMARY OF STATE RESOURCE FUNDING FOR THE NATIONAL GOVERNOR'S ASSOCIATION (NGA) AGREEMENT*
(For Federal Facility Compliance Act Support Planning)
(April 1996)

GROUP	FY 95	FY 96	FY 97
NGA**	960,000	200,000	200,000

* Funding is provided through the Office of Waste Management

** Cooperative agreement between DOE and the NGA provides funding primarily to the NGA to facilitate Federal Facility Compliance Act support planning with States, EPA and DOE. Funding started in FY 93 to cover FY 94 activities. Current project/budget period ends 9/30/96. A new agreement will need to be negotiated if EM decides to continue this project. The Office of Waste Management will budget $200,000 for FY 96 and FY 97 as the Office of Waste Management's portion of funding for this project

OFFICE OF ENVIRONMENTAL MANAGEMENT (EM) SUMMARY OF AGREEMENTS IN PRINCIPLE FUNDING ESTIMATES*

(April 1996)

SITE	FY 95	FY 96	FY 97
ALASKA [2]	132,637	112,192	123,051
CALIFORNIA [2] ****		1,500,000	0
COLORADO [3] **	2,845,000	3,000,000	3,000,000
FLORIDA 2 ***	110,792	141,000	148,000
IDAHO [1]	2,960,000	3,160,000	2,068,000
KENTUCKY [2]	542,000	1,800,000	1,800,000
MISSISSIPPI [2]	150,000	150,000	150,000
MISSOURI [2]	500,000	500,000	500,000
NEW MEXICO [1] *****	2,570,000	1,700,000	0
NEVADA [2]	1,137,669	1,501,348	1,509,200
OHIO (FERNALD) [2]	713,000	677,000	656,214
OHIO (MOUND) [2]	720,000	880,000	880,000
OHIO (PORTSMOUTH) [2]	746,521	718,000	950,000
TOTAL OHIO [2]	(2,179,521)	(2,275,000)	(2,486,214)
SOUTH CAROLINA [2]	1,665,000	1,992,000	2,139,000
TENNESSEE [2]	2,900,000	3,022,070	3,370,953
TEXAS [2]	1,031,064	1,237,360	1,299,228
GEORGIA [2]	550,000	575,000	594,484

* Funding provided through EM organizations is represented by #1 Office of Waste Management, or #2 Office of Environmental Restoration

** Beginning FY 97, funding for Colorado will be provided by #2 the Office of Environmental Restoration

*** In FY 96 , funding responsibility for Florida was transferred to #3 the Office of Nuclear Material and Facility Stabilization; FY 97 and out year funding will be provided by the Office of Site Operations

**** Agreement with California terminated February 1996

***** Projected new FY 97 funding for the New Mexico agreement will be zero The program anticipates using carry over funding

OFFICE OF ENVIRONMENTAL MANAGEMENT (EM)
SUMMARY OF FUNDING ESTIMATES FOR THE STATE OF WASHINGTON OVERSIGHT, EMERGENCY PLANNING AND INFORMATION NETWORK ACTIVITIES
(April 1996)

Washington*	FY 95	FY 96	FY 97
Emergency Management	491,800	692,000	639,000
Environ. Monitoring	522,139	411,775	411,000
Health Infor Network	2,806,001	2,500,000	2,000,000

* Activities are in addition to CERCLA monitoring activities.

OFFICE OF ENVIRONMENTAL MANAGEMENT (EM)
SUMMARY OF FUNDING ESTIMATES FOR THE STATE OF OREGON PUBLIC PARTICIPATION AND FIVE YEAR PLANNING ACTIVITIES
(April 1996)

Oregon	FY 95	FY 96	FY 97
Public Participation	543,000	543,000	404,000

GENERAL

Mr. Myers. Identify all new construction projects which are needed to meet legal requirements and identify the legal basis for each.

Admiral Guimond. Under the Waste Management program, there is one Defense construction project which is needed to meet legal requirements, Tank Farm Restoration and Safe Operations at Richland (97-D-402). The legal requirements for this project are: (1) Tri-Party Agreement milestones M-43-02 (Project W-314B, Double Shell Tank Ventilation Upgrade), M-43-04 (Project W-314, A Tank Farm Integrated Instrumentation System Upgrade), and M-43-05 (Complete Project W-314C Transfer System Upgrade); (2) RCRA; and (3) State of Washington Administrative Code, WAC 173-303, Dangerous Waste Regulations.

There is also one Non-Defense construction project under Waste Management, the ANL-Waste Handling Facility at Chicago (97-E-600). The purpose of the facility is to consolidate waste management operations to one area and to prevent any future RCRA violations related to 90-day storage areas for hazardous waste.

GENERAL

Mr. Myers. Please identify how much funding was allocated to the Historically Black Colleges and Universities program in fiscal years 1995, 1996, and proposed for 1997.

Admiral Guimond. The total Funding Allocated to HBCU from EM per year is as follows:

FY 1995	FY 1996 (projected)	FY 1997 (projected)
$30,582,400	$22,000,000	$12,000,000

GENERAL

Mr. Myers. Please identify the recipients of funding and descriptions of the activities which were funded:

Admiral Guimond. The information follows:

HBCU	ACTIVITY
Florida A&M University	Waste management in manufacturing engineering
Hampton University	Environmental and engineering science
Howard University	Modeling of contaminant fate and transport behavior of hazardous wastes; thermal treatment of hazardous waste.
Morgan State University	Site characterization and monitoring systems, hazardous waste, soil and bio-remediation, transportation systems for hazardous waste, Environmental modeling and simulation using high performance computing techniques.
North Carolina A&T U.	Hazardous and radioactive waste treatment and disposal, fate and transport of chemicals in the environment, innovative technologies for hazardous waste site remediation.
Prairie View A&T U.	Expertise in In-Situ remediation (biological and non-biological), Air pollution abatement, industrial waste treatment, stabilization and containment, and pollution prevention.
Southern University	Bioremediation, solid and hazardous water management, radioactive waste disposal, biochemical waste treatment, modeling of transport mechanisms for toxic chemicals, fossil fuel waste control technology.
Tennessee State University	Hazardous and radioactive waste treatment and disposal, fate and transport of hazardous chemicals in the environment, innovative technologies for hazardous waste site remediation or pollution.
Tuskegee University	Waste treatment and waste handling (the application of robotics to environmental restoration and waste management).
Clark Atlanta University	Laboratory assessment of supercritical water oxidation for

	treatment of trinitrotoluene wastewater. Educational consortium on environmental curricula
Spelman College	Research in collaboration with the DOE National Laboratories on remediation, pollution prevention, and economically competitive environmental technologies. Strengthening of college curricula in the environmental engineering and sciences. Bio-remediation of heavy metals.
Xavier College	Evaluate and determine the effects of hazardous materials in the aquatic environment.
Benedict	Strengthen math and science curricula and enrichment programs especially as they apply to the environmental areas.
Claflin	Strengthen science engineering and mathematics programs especially as they apply to the environmental areas.
Fort Valley State	Improve and increase the environmental science and engineering curricula and seek to develop environmental engineers and scientists degree program.

In addition, we fund the HBCU/MI Environmental Technology Consortium. The Consortium consists of:

- Alabama A&M University
- Florida International University
- Jackson State University
- New Mexico Highlands University
- Northern Arizona University
- Texas A&M University, Kingsville
- Texas Southern University
- University of Texas, El Paso

The purpose of the funding is to increase the participation of minority and educationally disadvantaged students in environmental restoration and waste management related research and technologies. Activities have included curriculum and faculty development, student recruitment and retention, outreach, and technology transfer.

HBCU FUNDING

HBCU	FY 1995	FY 1996 (Current Distribution)	FY 1997 (Not Yet Distributed)
Florida A&M University	$ .9M	----	
Hampton University	$ .9M	----	
Norfolk State	------	$ 1.7M	
Howard University	$ .919M	----	
Morgan State University	$ .6M	----	
North Carolina A&T U.	$ 1.287M	----	
Prairie View A&T U.	$ .6M	----	
Southern University	$ .61M	----	
Tennessee State University	$ .9M	----	
Tuskegee University	$ .6M	----	
Clark Atlanta University	$ 7.5M	$4M	
Spelman College	$ .06M	$ .5M	
Xavier College	$12.4M	$ 6M	
Benedict	$ .2M	----	
Claflin	$ .137M	----	
Fort Valley State	$1.3M	----	
HBCU/MI Environmental Technology Consortium.	Provided through Clark Atlanta		

- Alabama A&M University
- Florida International University
- Jackson State University
- New Mexico Highlands University
- Northern Arizona University
- Texas A&M University, Kingsville
- Texas Southern University
- University of Texas, El Paso

GENERAL

Mr. Myers. What process does the environmental management program use to select projects to be funded?

Admiral Guimond. Environmental Management Headquarters works with the Field/Operation Offices to evaluate proposals and determine which Historically Black Colleges and Universities (HBCU) projects are to receive funding. The Operations Offices interact with the academic community to identify DOE needs and academic capabilities. Unsolicited proposals as well as responses to Requests for Proposals are evaluated for their quality and their benefit to the specific environmental program area and a site's unique problems. Long term benefit to the Department's Environmental Management program is considered in terms of strengthening academic capability to produce the environmental engineers and scientists needed for the future.

Additionally, the Office of Environmental Management pursued a nation-wide competitive selection process to reach the broadest possible number of candidates. This process resulted in an award to the HBCU/MI/ET consortium. A five year cooperative agreement running from September 30, 1995, to September 29, 1996, was executed.

GENERAL

Mr. Myers. The budget request includes $150 million in the use of prior year balances to offset new funding requirements. Please identify the specific items that make up this funding.

Admiral Guimond. Environmental Management (EM) offset its fiscal year (FY) 1996 budget request by $300 million through the "Use of Prior Year Balances." At the time the FY 1996 appropriation bill was enacted, the EM program had identified, deobligated, and returned to the U.S. Treasury $314.4 million.

EM carryover balances have declined significantly during the past year; therefore, we believe $150.4 million (approximately half the FY 1996 level) is a prudent amount of uncosted carryover to use as an offset to the FY 1997 budget request.

The $150.4 million prior year balances is non-specific at this time. We do not have a list of impacted projects and sites. EM plans to monitor the costing of obligations throughout FY 1996 and to distribute the FY 1997 uncosted offset accordingly. Carryover thresholds established by EM and now recognized by the General Accounting Office as reasonable levels (E.g., capital equipment - 45 percent) will be used as a guide in making final determinations by site.

The chart below reflects a preliminary distribution of the $150.4 million uncosted offset. This breakdown was included in the Defense Environmental Management budget request for fiscal year 1997. Although this distribution may be adjusted, it is an indication of the potential dollar magnitude by location.

Field Offices	Prior Year Balances Offset ($ in Thousands)
Albuquerque	($11,814)
Chicago	($3,890)
Idaho	($14,429)
Nevada	($2,301)
Oakland	($3,468)
Oak Ridge	($21,632)
Ohio	($15,535)
Richland	($21,761)
Rocky Flats	($15,610)
Savannah River	($17,960)
Headquarters	($22,000)
TOTAL	**($150,400)**

GENERAL

Mr. Myers. The Office of Fissile Materials has requested $17 million for the design of a long-term storage facility for plutonium. This request will support a late 1996 record of decision at which time the Department will coordinate with other DOE programs to integrate storage plans/capabilities to optimize existing facilities and minimize costs. Given this, what merit exists for fiscal year 1997 consideration of the Savannah River "Actinide Packaging and Storage Facility" which appears to be another plutonium facility in response to DNFSB recommendation 94-1? Wouldn't it be more prudent to wait until the record of decision process is completed and to consider the Savannah River requirements?

Admiral Guimond. The Savannah River Actinide Packaging and Storage Facility is required for stabilization and repackaging of certain plutonium solids to meet the Department's storage standard. This facility would be needed whether or not the "long-term storage facility" referred to was being built because they serve different technical purposes. The SRS facility is needed for storing a variety of nuclear material forms, including, scrap oxides as well as metal forms. By contrast, the long-term storage facility is intended for storage of metallic plutonium, such as the type used in nuclear warheads. In addition to this difference, primarily related to the packaging function, the SRS associated storage facility is needed for post-packaging interim storage. This activity is the subject of a commitment to the Defense Nuclear Facilities Safety Board (DFNSB) to stabilize, package, and store the plutonium at Savannah River Site (SRS) by the year 2001. The SRS schedule, as it stands, is extremely tight and any additional delay would jeopardize meeting the DNFSB commitments. This effort is being coordinated with the Office of Fissile Materials in an effort to eliminate inefficiencies and duplication of effort. For example, we are sharing costs to create a modular design that would be suitable as a "DOE vault" to be used throughout the complex. This action eliminates having several conceptual and detailed designs for various vault configurations going on simultaneously. The FY 1997 capital funded activities for the Actinide Packaging and Storage Facility will not take place until the second quarter, by which time the record of decision should be released. Independent of the DNFSB commitments, however, maintaining the schedule for the vault is critical to realizing the major cost savings that can be achieved by removal of the nuclear materials from the canyon facilities following stabilization. While these materials remain in the canyons, surveillance and maintenance costs remain very high due to the need to address regulatory compliance issues, maintain the safety authorization basis, perform material accountability activities, provide utilities and assure safety. The longer the delays, the higher the costs.

GENERAL

Mr. Myers. What specific measures have been taken and/or planned at the various field locations to redefine minimum safety requirements, such as rewriting safety analysis reports, within surplus facilities to reduce costs and allow redirection of resources to higher priority needs?

Admiral Guimond. The Office of Environmental Management has developed and issued guidance on hazard categorization that allows for a more accurate accounting of hazards associated with typical environmental activities. This guidance has led to a significant reduction in the number of facilities requiring Safety Analysis Reports (SARs) and other types of safety analysis documentation.

In addition to streamlining nuclear facility hazard documentation, efforts are ongoing to reduce or eliminate procedural requirements that are unnecessary. The Department of Energy has developed policy for application of safety requirements based on actual hazards. We are making a transition to this new hazard-based approach to safety management. DOE has recently conducted pilots to test this approach at selected facilities around the country.

GENERAL

Mr. Myers. Provide detail by field element for fiscal years 1996 and 1997 with associated incremental costs amounts for each measure.

Admiral Guimond. This information is currently not available. We will provide this information by July 1, 1996. Please regard this as an interim response.

GENERAL

Mr. Myers. Please provide the integrated priority list for each site.

Admiral Guimond. I am happy to provide, for the record, the FY 1997 priority lists that accompanied the FY 1997 budget submittal from our Operations Offices. I aml also including a copy of each Office's transmittal letter. The integrated priority lists proved useful during our internal budget decision-making process. The lists provided an understanding of the Operations Offices' priorities as well as a basis for quickly understanding the impact of cutting or adding funding to a particular budget. During internal Environmental Management budget negotiations, the priority list information was used to evaluate program budget requests. The information follows:

U.S. DEPARTMENT OF ENERGY
ALBUQUERQUE OPERATIONS OFFICE
ENVIRONMENTAL PROGRAMS
FY 1997 PRIORITY LIST
(DOLLARS IN THOUSANDS)

STATE	SITE	PROGRAM	DESCRIPTION	AMOUNT
	All	ER	Program Direction	6,749
	All	WM	Program Direction	5,419
	All	FT	Program Direction	2,117
	All	WM	Core Activities (Proj Mgmt)	19,496
	VL	ER	Core Activities (Proj Mgmt/Tech Supt-SNL/LANL/GJPO)	19,637
	All	WM	Treatment/Storage & Disposal	30,948
	GJFO	WM	MTU Testing/Operations	2,302
	VL	ER	Small Site Strategy (KC/PI/PX/SV/ITRI/CA/GJPORAP/UMT-S)	54,752
	PI	FT	Pinellas Landlord	23,810
	LANL	WM	Exist. Rad Liq Wste Trmnt Fac	6,198
	GJPO	ER	WM Operations	1,000
	GJPO	ER	Monticello Remedial Action	25,170
	GJPO	ER	Monticello Surf & GW	1,133
	KC	WM	Replace Ind. Waste Piping	2,390
	SNL	ER	Tech Area II (High Prior Sites)	3,434
	SNL	ER	Tech Area I (High Prior Sites)	250
	SNL	ER	Tijeras Arroyo (High Prior Sites)	98
	SNL	ER	Foothills Test Area (High Prior Sites)	995
	LANL	WM	LANL TRU Storage	8,329
	LANL	ER	LANL FU #4	3,209
	LANL	ER	LANL FU #5	3,500
	LANL	WM	Low Level Waste Disposal (Area G)	6,201
	LANL	ER	LANL FU #2	5,000
	SNL	ER	Chem Waste Landfills (Med Prior Sites	638
	SNL	ER	Tech Areas III & V (Med Prior Sites	308
	SNL	ER	Mixed Waste Landfill (Med Prior Sites)	713
	SNL	ER	Canyons Test Area (Med Prior Sites	350
	VL	WM	Waste Min/Pollution Prevention (ALAL50)	3,133

U.S. DEPARTMENT OF ENERGY
ALBUQUERQUE OPERATIONS OFFICE
ENVIRONMENTAL PROGRAMS
FY 1997 PRIORITY LIST
(DOLLARS IN THOUSANDS)

STATE	SITE	PROGRAM	DESCRIPTION	AMOUNT
	ITRI	WM	Waste Min/Pollution Prevention (ALAL51)	34
	GJPO	ER	Waste Min/Pollution Prevention	200
	GJPO	ER	Monticello Vicinity Properties	2,700
	AL	WM	Program Control	1,530
	AL	WM	Native American/Tech Support	660
	AL	ER	Program Support (AL 17)	500
	GJPO	ER	Long Term Surv & Maint	1,030
	GJPO	ER	Ground Water	3,284
	GJPO	ER	Ground Water Prog Mgmt	4,536
	LANL	ER	LANL FU #1	10,421
	LANL	ER	LANL FU #3	4,000
	LANL	WM	New Rad Liq Wast Treat Fac	740
	LANL	WM	Mixed Waste Operations	3,231
	SNL	ER	Central Coyote Test Area (Low Prior Sites)	905
	SNL	ER	Septic Tanks & Drain Fields (Low Prior Sites)	392
	SNL	ER	SNL Engineering Reactor (Low Prior Sites)	102
	GJPO	ER	Monticello Independent Verific	400
	GJPO	ER	GJPORAP Indep Verific	185
	GJPO	ER	Uranium Leasing	300
	PI	FT	Deactivation Actions	6,449
	PI	FT	Program Integration	1,414
	LANL	ER	D&D	9,695
	LANL	WM	TRU Remediation	4,618
	LANL	ER	Mixed Waste Disposal Facility	740
	SNL	ER	Site Wide Characterization	400
	SNL	ER	Corrective Action Management Unit	3,398
	SNL	ER	Southwest Test Area	50

U.S. DEPARTMENT OF ENERGY
ALBUQUERQUE OPERATIONS OFFICE
ENVIRONMENTAL PROGRAMS
FY 1997 PRIORITY LIST
(DOLLARS IN THOUSANDS)

STATE	SITE	PROGRAM	DESCRIPTION	AMOUNT
	LANL	WM	Controlled Air Incinerator	1,138
	LANL	ER	LANL FU #6	1,985
	SNL	TM	Innov. Tech for Transp of H&LLW	5,145
	LANL	TM	Innov. Tech for Transp of H&LLW	61
	AL	TM	Innov. Tech for Transp of H&LLW	51
	GJPO	ANL	Laboratory Supt for New Sampling Techniques	343
	LANL	ANL	Laboratory Supt for New Sampling Techniques	1,207
	AL	FT	Program Support	425
	LANL	FT	Surveillance and Maintenance	64
			DECREMENT TOTAL	309,388

U.S. DEPARTMENT OF ENERGY
ALBUQUERQUE OPERATIONS OFFICE
ENVIRONMENTAL PROGRAMS
FY 1997 PRIORITY LIST
(DOLLARS IN THOUSANDS)

STATE	SITE	PROGRAM	DESCRIPTION	AMOUNT
	LANL	FT	Surveillance & Maintenance	153
	All	FT	Program Direction	475
	All	WM	Program Direction	815
	All	WM	Core Activities (Proj Mgmt)	845
	VL	ER	Core Activities (Proj Mgmt/Tech Supt -SNL/LANL/GJPO)	5,868
	All	WM	Treatment/Storage & Disposal	1,395
	GJPO	WM	MTU Testing/Operations	6,274
	VL	ER	Small Site Strategy (KC/PI/PX/SV/ITRI/CA/Oxd/GJPORAP/UMT-S)	12,165
	VL	ER/WM	Agreements-In-Principle	4,369
	GJPO	ER	WM Operations	578
	GJPO	ER	Monticello Remedial Action	1,609
	LANL	ER	LANL FU #4	317
	LANL	ER	LANL FU #5	2,516
	VL	WM	Waste Min/Pollution Prevention ALAL50	591
	GJPO	ER	Waste Min/Pollution Prevention	89
	ITRI	WM	Waste Min/Pollution Prevention ALAL51	6
	GJPO	ER	Long Term Surv & Maint	405
	LANL	ER	LANL FU #1	1,659
	LANL	ER	LANL FU #3	817
	LANL	WM	Mixed Waste Operations	7,037
	GJPO	ER	Monticello Independent Verific	48
	GJPO	ER	GJPORAP Independent Verific	173
	GJPO	ER	Uranium Leasing	600
	PI	FT	Deactivation Actions	4,610
	LANL	WM	TRU Remediation	178
	LANL	ER	Mixed Waste Disposal Facility	680
	LANL	WM	GPP/Line Item Planning	250
	PI	FT	Program Support	75
			TARGET TOTAL	363,983

April 15, 1994

U.S. DEPARTMENT OF ENERGY
ALBUQUERQUE OPERATIONS OFFICE
ENVIRONMENTAL PROGRAMS
FY 1997 PRIORITY LIST
(DOLLARS IN THOUSANDS)

STATE	SITE	PROGRAM	DESCRIPTION	AMOUNT
	All	ER	Program Direction	4,248
	All	WM	Program Direction	8,566
	SNL	ER	Correction Action Management Unit	1,734
	SNL	TM	Innov. Tech for Transp of H&LLW	6,015
	AL	TM	Oversight of NM Transp Techniques	28
	GJPO	ANL	Laboratory Support	1,536
	All	WM	Core Activities (Proj Mgmt)	8,837
	VL	ER	Core Activities (Proj Mgmt/Tec Supt-LANL/GJPO)	5,599
	All	WM	Treatment/Storage & Disposal	6,310
	LANL	WM	Exist. Rad Liq Wste Trmnt Fac	1,078
	PI	FT	Deactivation Actions	10,241
	PI	FT	Landlord Base	9,000
	LANL	ER	LANL FU #5	1,815
	LANL	ER	LANL FU #2	4,526
	LANL	WM	TRU Storage	1,145
	LANL	WM	Low Level Waste Disposal	10,997
	VL	WM	Waste Min/Pollution Prevention (ALAL50)	4,935
	ITRI	WM	Waste Min/Pollution Prevention (ALAL51)	4
	AL	WM	Program Control	450
	AL	WM	Native American/Tech Support	195
	LANL	ER	LANL FU #1	10,944
	LANL	ER	LANL FU #3	832
	LANL	WM	New Rad Liq Waste Treatment Fac	5,700
	LANL	WM	Mixed Waste Operations	9,081
	GJPO	ER	Uranium Leasing	700
	PI	ER	ITRD	2,500

U.S. DEPARTMENT OF ENERGY
ALBUQUERQUE OPERATIONS OFFICE
ENVIRONMENTAL PROGRAMS
FY 1997 PRIORITY LIST
(DOLLARS IN THOUSANDS)

STATE	SITE	PROGRAM	DESCRIPTION	AMOUNT
	LANL	ER	Mixed Waste Disposal Facility	900
	SNL	ER	Site Wide Characterization	195
	AL	FT	Program Support	1,100
	PX	ER	D&D	1,720
	LANL	ER	D&D	72
	LANL	WM	TRU Remediation	1,152
	LANL	WM	GPP	3,800
	LANL	WM	GPP Planning	2,626
	GJPO	ER	Groundwater Program Management	3,130
	GJPO	ER	Groundwater Compliance Action	470
	LANL	FT	Surveillance & Maintenance	583
	PI	FT	GPP	367
	VL	FT	New Work Scope (LANL/GJPO/PX/SNL/KC/ITRI)	9,150
			PLANNING TOTAL	506,242

U.S. DEPARTMENT OF ENERGY
ALBUQUERQUE OPERATIONS OFFICE
ENVIRONMENTAL PROGRAMS
FY 1997 PRIORITY LIST
(DOLLARS IN THOUSANDS

AL EM FY97 Budget Prioritization

The AL Budget Prioritization incorporates the following EM Programs:

- WM - Waste Management (EM-30)
- ER - Environmental Restoration (EM-40)
- TM - Technology Development (EM-50)
- FT - Facility Transition (EM-60)

The baseline criteria used in the budget prioritization involved the use of five attributes from the Risk Data sheets as follows:

- Public Safety & Health
- Site Personnel Safety & Health
- Compliance
- Mission
- Environmental

The ADSs were then adjusted by results (i.e. EM-40's Small Site Completion Strategy) and regulator's and stakeholder's input. Some ADS's may have been combined or split based on risk and/or results, stakeholder and regulator input.

Definitions:

VL = Various Locations
FU = Field Unit
Oxd = Oxnard
MTU = Mobile Treatment Unit
H&LLW = High & Low Level Waste

CHICAGO OPERATIONS OFFICE
FINAL PRIORITY LIST

ADS	30/40	PROJECT NAME	M AVG	WS AVG	EH AVG	SM AVG	CL AVG	CO AVG	IT AVG	PF AVG	SCORE	ADS FY97 TAR
1300/1B	30	BASE OPERATIONS-EAST	90	90	90	90	100	70	56	90	8720	9356
1301A	30	WM PROJ - PROG MGMT	90	90	90	90	100	70	56	90	8720	150
1601	30	BASE OPS - WEST	90	90	90	90	100	70	56	90	8720	3087
2222	30	BASE OPS - BNL	90	90	90	90	100	70	56	90	8720	5561
3100	30	BASE OPS - PPPL	90	90	90	90	100	70	56	90	8720	4948
4100	30	BASE OPS - FERMI	90	90	90	90	100	70	56	90	8720	1517
5100	30	BASE OPS - AMES	90	90	90	90	100	70	56	90	8720	356
1601	30	FERMI SOD PROC-ANL-W	90	100	90	70	100	60	80	70	8620	2071
3100	30	TFTR S&R	95	75	80	75	70	75	60	90	7760	2795
3100	30	STORM DISCH. MONITORING	90	50	90	75	70	75	50	90	7370	132
2300	40	PROGRAM MANAGEMENT	60	40	100	100	100	50	50	70	7340	1789
2303	40	OU I/VI	60	40	100	100	100	50	50	70	7340	500
2307	40	OU V	60	40	100	100	100	50	50	70	7340	591
8201	40	IAG/AIP	60	40	100	100	100	50	50	70	7340	250
2302	40	SITEWIDE ACTIVITIES	60	50	100	100	70	60	50	80	7220	653
1437	40	CP-5 D&D	80	90	90	70	10	50	100	90	7160	3631
1438	40	PROG MGMT D&D	80	90	90	70	10	50	100	90	7160	474
2305	40	OU III	60	40	90	100	100	50	50	70	7160	440
1434	40	MIXED WSTE STOR/DISP	60	70	90	70	70	50	100	50	7120	1750
1439	40	PROGRAM MANAGEMENT	60	70	90	70	70	50	100	50	7120	600
2310	40	CESSPOOLS	60	80	90	100	80	50	10	90	7080	200
1602	30	GPP LINER REPLACEMNT	90	40	90	90	70	70	10	100	7080	299
2303	40	LANDFILLS	60	40	90	100	80	60	100	40	7020	8669
4100	30	RFI/IWS	70	60	85	90	70	50	30	90	7010	287
2310	40	SPRAY AERATION	60	30	100	100	70	60	80	60	6900	3854
1700	40	PROGRAM MANAGEMENT	60	55	65	80	100	60	35	80	6840	118
1702	40	WAG 9 ASSESSMENT	60	55	0	80	100	60	35	80	5670	1597
2304	40	OU II/VII	60	70	70	70	100	50	20	70	6800	773
3100	30	ANN RAD WASTE DISP-PPPL	40	75	80	75	70	75	10	90	6720	125
2222	30	LEGACY WASTE DISP -BNL	40	75	80	90	70	50	10	90	6670	357
3200	40	PROGRAM MANAGEMENT	50	55	70	80	70	75	50	90	6670	250
3201	40	G'WATER CHARACT/REMED	50	55	70	80	70	75	50	90	6670	250
1433	40	SOLID WSTE STOR/DISP	60	50	90	70	70	50	50	70	6560	750
4100	30	PCB TRANSF. CLEANUP	70	50	85	60	70	50	30	90	6530	125
2306	40	OU IV	60	40	50	70	100	60	70	80	6480	2531
1303	30	LI REHAB OF 306	70	90	50	70	60	50	10	90	6400	1553
1432	40	REMEDIAL SPT ACTIVITIES	60	50	70	70	70	50	50	70	6200	307
8204	40	SITE A S&M	10	50	80	100	40	90	30	100	6060	170
1301B	30	ANN RAD WASTE DISP	40	75	80	75	40	50	10	90	6040	0
2222	30	ANN RAD WASTE DISP-BNL	40	75	80	75	40	50	10	90	6040	0
4100	30	Rad Waste Disposal	40	75	80	75	40	50	10	90	6040	440
8207	40	SITE A REMEDIATION	50	50	75	90	70	90	50	90	5930	0
3104	30	GPP DETENTION CELL	90	50	75	50	0	50	10	95	5760	450
8208	40	PPPL SITE A/B CHAR/REM	10	50	95	60	70	50	15	50	5470	0
1703	40	CLPA D&D	50	80	80	60	10	10	10	90	5300	3
5202	40	CDS RI/FS AND RD/RA	10	50	50	100	50	30	50	90	5260	200
5203	40	PROGRAM MANAGEMENT	10	50	50	100	50	30	50	90	5260	50
8103	30	WASTE MINIMIZATION	50	50	50	60	40	10	50	90	5020	973
1437	40	JANUS	80	50	50	60	10	50	20	90	4980	664
8203	40	PIQUA S&M	10	50	50	100	10	90	10	100	4880	10
1438	40	310 RETENTION TANKS	80	50	50	60	10	50	20	90	4740	1300
1605	30	LI WASTE HAND. FAC	40	60	60	50	30	30	50	40	4660	0
8202	40	HALLAM S&M	10	50	50	100	0	30	75	75	4510	20
5201	40	UST CONTAM ASSESS/REM	10	50	30	80	10	10	10	100	3680	50
8205	40	SPRU D&D	10	50	30	70	10	10	50	50	3400	0

ASSUMPTIONS

The CH-EM prioritization assumes the following:

The prioritization scheme is intended to be utilized as a decision-aiding tool and not a decision-making tool. This implies that as with all models of this nature, common sense and managerial expertise must be utilized in interpreting the results of the prioritization and in making final decisions.

DEFINITIONS

RATING CRITERIA:

MISSION:

Mission refers to the importance of the project and/or activity to the success of the primary purpose of the site. For example, BNL and ANL are research facilities whose research efforts are their main focus and are supported by Waste Management and Environmental Restoration funding, activities, and projects. A potential scoring scenario follows:

90-100	Activity/Project absolutely vital to key site activities (shutdown of key site activities possible).
50-90	Activity/Project will have some moderate level of impact on number of site activities
10-50	Activity/Project will have some low level of impact on a few site activities.
0-10	Activity/Project will have absolutely no impact on other site activities.

WORKER SAFETY:

Worker safety refers to the level of impact the activity and/or project has or would have on the safety of those on-site workers both directly working on the project and other on-site workers potentially impacted by the activity. A potential scoring scenario follows:

90-100	Activity/Project does/will significantly increase net worker safety (Potential for severe or multiple injuries or exposure(s) greater than occupational limits currently exist(s) or will occur if activity ceases.)
55-90	Activity/Project will have some net positive impact on overall worker safety (Potential for exposure(s) less than occupational limits or minor injuries currently exist(s) or will occur if activity ceases.)
45-55	Activity/Project will not have a net increase or decrease worker safety
10-45	Activity/Project will have some net negative impact on worker safety (Potential for exposure(s) less than occupational limits or minor injuries would increase due to initiation of activity.)
0-10	Activity/Project will significantly decrease the level of worker safety (Potential for severe or multiple injuries and/or exposure(s) greater than occupational limits would increase due to initiation of activity.)

The term "net" increase or decrease refers to the change in worker safety over the long term (beyond completion of an activity or project).

ENVIRONMENTAL AND HUMAN HEALTH RISK:

Environmental and Human Health risk refers to the anticipated and/or achieved reduction in the potential harm to the environment or to human health (non-worker, public) due to the proposed project and/or ongoing activity. A potential scoring scenario follows:

90-100	Activity/Project will significantly reduce risk (Significant risk such as a high probability of damage to the ecosystem or excessive exposure to the public currently exists or would occur if activity ceases.)
10-90	Activity/Project will cause some reduction to risk (Some low to moderate probability of damage to the ecosystem or exposure to the public currently exists or would occur if activity ceases.)
0-10	Activity/Project will not significantly affect risk (No significant risk currently exists or would occur if activity ceases.)

STAKEHOLDER/MANAGERIAL INPUT:

Stakeholder/Managerial input refers to a number of potential "outside" factors which can influence or affect the priority of a project or activity. Such influences may include but are not limited to: public/stakeholder involvement, Congressional mandate, State government involvement, DOE Management involvement, etc. A potential scoring scenario follows:

90-100	Activity/Project has very strong, positive influences (i.e. strong support for the project or activity from DOE Management and/or Stakeholders.)
55-90	Activity/Project has some positive influences (i.e. some level of support for the project or activity.)
45-55	Activity/Project has no influences
10-45	Activity/Project has some negative influences (i.e. some level of opposition to the project or activity from stakeholders.)
0-10	Activity/Project has very strong, negative influences (i.e. strong public and local government opposition.)

COMPLIANCE/LEGAL:

Compliance/Legal refers to those activities or projects which are required to maintain compliance with legal requirements. These requirements may include but are not limited to: RCRA, CERCLA, Regulatory Agreements, TSCA, NRC license requirements, CWA, etc. A potential scoring scenario follows:

90-100	Activity/Project has clear and enforceable legal implications (Severe fines or penalties are very likely)
50-90	Activity/Project has some potential for compliance implications (varying probability of moderate to severe fines exists.)
10-50	Activity/Project has some potential for lesser compliance implications (varying probability of minor to moderate fines exists.)
0-10	Activity/Project has no legal implications (no possibility of fines)

CONTRACTUAL:

Contractual refers to those activities or projects which are necessary to fulfill contractual obligations between the DOE and its' contractors. A potential scoring scenario follows:

90-100	Activity/Project is clearly a contractual obligation and the likelihood of legal action in the event of DOE default is very high.
10-90	Activity/Project is in part included in a contractual obligation (The score can be equated to the likelihood of legal action resulting from DOE breech of contract.)
0-10	Activity/Project is not a part of any contractual obligation therefore no legal action is likely.

INNOVATIVE TECHNOLOGY:

Innovative technology refers to the DOE management goal of utilizing innovative technologies in order to achieve cost savings. An activity and/or project would be scored according it's potential or actual use or demonstration of new and innovative technologies. A potential scoring scenario follows:

90-100	Activity/Project will utilize or demonstrate innovative technology(ies) resulting in substantial cost savings and/or schedule acceleration, or reduced emissions and/or exposures.
50-90	Activity/Project has some level of potential for the utilization or demonstration of innovative technology(ies) which would result in some cost savings and/or schedule acceleration, or reduced emissions and/or exposures.
10-50	Activity/Project has some level of potential for the utilization or demonstration of innovative technology(ies).
0-10	Activity/Project has no potential for use or demonstration of innovative technologies.

PROJECT FEASIBILITY/UNCERTAINTY:

Project feasibility/uncertainty refers to the potential or actual risk involved in the completion on continuance of the activity or project. Common sources of risk could include but are not limited to: technology availability and reliability, contractor capabilities, ability of contractor to meet schedules, regulatory requirements/involvement, public/political involvement, new start or ongoing project, funding/budgeting, etc. A potential scoring scenario follows:

90-100	Activity/Project is straightforward with little risk involved
10-90	Activity/Project has some level of risk involved
0-10	Activity/Project has extreme risk involved and little hope of completion or success.

The scoring can alternatively be viewed as the percent probability that the event will/can occur. In addition, the scores given for this criteria should to the greatest extent possible take into account the cost-effectiveness of the activity or project.

OTHER SCORING NOTES:

Where Program Management funding has been separately identified for a contractor, the program management activity has been scored identically to the activity the program management supports with the highest to score. For example, the Program Management activity in support of waste operations at ANL-E has been scored identically to the base waste operations activity at ANL-E. In this way, program management activities will be closely tied (and therefore prioritized with) with the activities that it supports.

EXPLANATION OF WEIGHING OF CRITERIA

The relative weights of the criteria were developed by comparison of the criteria against one another in order to assign a relative level of importance for each. The total weight of all the criteria totals one hundred. The important factor in the prioritization is not necessarily the absolute value of the weighing factor but rather the value of the weights as compared to each other.

1) The Worker Safety and Environmental & Human Health Risk criteria were determined to be the most important criteria deserving the highest weight due to DOE's commitment to worker safety and environmental and human health risk reduction.

2) The next highest criterion was Compliance/Legal due to the DOE mandate that to the extent possible all DOE activities will maintain compliance with all applicable rules and regulations.

3) The next highest rated criterion, Mission, refers to the impact of the project upon the primary purpose of the site (in most cases research).

4) The next two highest criteria were Stakeholder/ Managerial Input and Project Feasibility/Uncertainty. It is felt that these criteria should not receive as high a weighing as the previously mentioned criteria.

5) The last two criteria, Innovative Technology and Contractual are ranked the lowest, not because they are unimportant, but because they are less important than the other criteria. A project receives a score for each criterion, and that criterion is multiplied by the weighing factor. The following provides the weighing factors used in the DOE-CH preliminary prioritization list:

CRITERION	FACTOR
Environmental and Human Health Risk	18
Worker Safety	18
Compliance/Legal	16
Mission	12
Stakeholder/Managerial Input	10
Project Feasibility/Uncertainty	10
Innovative Technology	8
Contractual	8

IDAHO

EM FY-97 Integrated Priority List

Integrated Rank	Org	Act. #	ADS. #	Title	Funding Source	FY97 ($K)	Cum. Cost ($K)
0.30	DOE-ID			DOE-ID EM-30 PROGRAM DIRECTION	30	$12,995	$12,995
0.31	DOE-HQ			NATIONAL LLW &SNF PROGRAM	30	$10,000	$22,995
0.40	DOE-ID			DOE-ID EM-40 PROGRAM DIRECTION	40	$9,500	$32,495
0.60	DOE	6301	6301	DOE-ID EM 60 PROGRAM DIRECTION (d/t/p)	60	$6,325	$38,820
0.70	DOE-ID	6301		DOE PROGRAM DIRECTION (RESL)	20	$3,650	$42,470
0.71	DOE-ID			ANALYTICAL LABORATORY	20	$490	$42,960
0.72	DOE-ID			TRANSPORTATION PROGRAM	20	$150	$43,110
1	WM		4301	DOE-ID PROGRAM SUPPORT	30	$4,590	$47,700
2	WM	6311	4310	HAZARD AND TOXIC CONTROL	30	$313	$48,013
3	ER	110127B	28EG 111E1(P)	WAG 1-07B GROUNDWATER REMED.	40	$6,002	$54,015
4	WM	420P	4310	HW TREATMENT	30	$420	$54,435
5	ER	3XLR10000	41EG 111E1(P)	WAG 10-06 RADCON SOIL	40	$1,600	$56,035
6	ER	3KKLFT000	65EG 111E1(P)	D&D LOFT ANCILLARIES CLEANUP	40	$56	$56,091
7	WM	6221B	4303	WEDF UPGRADES	30	$800	$56,891
8	WMNU	9999	6331	PBF S & M (non defense) (d)	60	$1,680	$58,571
9	WMNU	6342B	6342	ARMF/CFRMF (non defense) (d)	60	$180	$58,751
10	WM	6332	4104	STATE MONITORING	30	$1,960	$60,711
11	WMNU	6342A	6342	MTR/DEACTIVATION (non defense) (d)	60	$2,354	$63,065
12	WMNU	E176	1001	RAD INSTRUMENT MONITORING	30	$670	$63,735
13	WMNU	A11	6313	UTILITY OPERATIONS (d)	60	$9,952	$73,687
14	ER	3KNETC000	60EG 111E1(P)	D&D ETR	40	$42	$73,729
15	ER	3KNMTC000	54EG 111E1(P)	D&D MTR	40	$42	$73,771
16	ER	3XA06D000	30EG 111E1(P)	WAG 2 OU 2-13 RI/FS & RD/RA	40	$1,049	$74,820
17	WMNU		6315	ES&H PROGRAM SUPPORT (d)	60	$7,680	$82,500
18	ER	1105205	36EG 111E1(P)	WAG 5 SL-1 CLEANUP	40	$2,500	$85,000
19	WM	6317	4313	AIR QUALITY	30	$543	$85,543
20	ER	3XWC05000	40EG 111E1(P)	WAG 7 TRU PITS & TRENCHES	40	$2,572	$88,115
21	ER	1107208	40EG 111E1(P)	WAG 7 OCVZ	40	$2,199	$90,314
22	ER	3XCB40000	34EG 111E1(P)	WAG 4-13 COMP. RI/FS	40	$1,080	$91,394
23	WM	430H +	4310	HW STORAGE	30	$1,805	$93,199
24	WM	6221A	4303	DISPOSAL VAULTS	30	$1,840	$95,039
25	ER	3XBB30000	36EG 111E1(P)	WAG 5 COMP RI/FS	40	$2,000	$97,039
26	ER	3XW045000	40EG 111E1(P)	WAG 7 GROUNDWATER PATHWAYS	40	$433	$97,472
27	ER	3XLA50000	41EG 111E1(P)	WAG 10-02 ASSESSMENT (LEACH POND)	40	$384	$97,856
28	ER	3XLA60000	41EG 111E1(P)	WAG 10-03 ASSESSMENT (ORDINANCE)	40	$1,300	$99,156
29	WMNU	B84	6326	SECURITY FAC UPGRADES (d/t/p)	60	$6,060	$105,216
30	ER	41130	1204WN 111E1(P)	WAG 3-13 COMP. RI/FS	40	$3,100	$108,316
31	WM	110P +	4311	TRU SUPPORT	30	$3,433	$111,749
32	WMNU	D1111X	1010	CPP-603 FUEL RELOCATION	30	$9,628	$121,377
33	SS/NU	63171Z	63171	INEL GPPS (d)	60	$6,938	$128,315
34	WM	230T +	4310	MW STORAGE	30	$3,050	$131,365
35	WMNU	E175	1001	WASTE & SUPPORT TRAINING	30	$513	$131,878

EM FY-97 Integrated Priority List

Integrated Rank	Org	Act. #	ADS. #	Title	Funding Source	FY97 ($K)	Cum. Cost ($K)
36	WM	6212	4301	RADCON IMPLEMENTATION	30	$307	$132,185
37	WMNU		6314	ENGINEERING SUPPORT (d)	60	$4,845	$137,030
38	WMNU	E154	1001	CORROSION PROGRAM	30	$724	$137,754
39	WMNU	D23	1012	SPENT FUEL TECHNOLOGY	30	$3,000	$140,754
40	WMNU	F331	1012	SPENT FUEL TECHNOLOGY	30	$534	$141,288
41	WMNU	4307	4307	DRY CASK STORAGE	30	$8,031	$149,319
42	WMNU	E171	1001	PROC & DOCUMENT SERV	30	$893	$150,212
43	WMNU	F122	1001	SERV WASTE MAINT OF DCS	30	$0	$150,212
44	SS	6311K	6311	OSO (d)	60	$1,720	$151,932
45	WMNU	C22	6332	ICPP S & M (d)	60	$4,640	$156,572
46	SS	63177	63177	MEDICAL FACILITIES (d/t/p)	60	$263	$156,835
47	WMNU	B161	6314	ADMIN SUPPORT (d)	60	$4,030	$160,[illegible]65
48	WMNU	D112	6316	CPP-651 SNM STOR OPS (d/t)	60	$852	$161,717
49	SS	[illegible]311E	6311	EMERGENCY PREPAREDNESS (d)	60	$1,640	$163,357
50	WMNU	B141	6313	GENERAL SERVICES (d)	60	$7,353	$170,710
51	WMNU	D113/114/115	1010	FUEL STORAGE	30	$11,361	$182,071
52	WMNU	D134	1010	EM 30 CORE TEAMS	30	$680	$182,751
53	WMNU	D133	1010	NUC OPS TRAINING	30	$606	$183,357
54	WMNU	D132	1010	EM30 QUALITY ASSURANCE	30	$475	$183,832
55	WMNU	D121A	1010	CORROSION PROGRAM	30	$772	$184,604
56	WMNU	E111/112/113/151/152	1001	EM 30 WASTE OPERATIONS	30	$29,961	$214,565
57	WMNU	E131/132/134	1001	TRAFFIC AND WASTE MANAGEMENT	30	$3,170	$217,735
58	WMNU	E173	1001	EM 30 CORE TEAMS	30	$410	$218,145
59	WMNU	E115	1001	FDP S&M	30	$503	$218,648
60	WMNU	E161	1001	EM 30 ENV COMPLIANCE	30	$3,866	$222,514
61	WMNU	E224	1001	WASTE OPS CAPITAL EQUIPMENT	30	$3,500	$226,014
62	SS/NU	6312F	6312	GPCE BASE (d)	60	$6,806	$232,820
63	WM	380L +	4310	LANDFILL OPS	30	$1,107	$233,927
64	WM	[illegible]11A	4312	SPENT FUEL OPS - TAN (t)	30	$2,443	$236,370
65	WM	110R +	4311	TRU OPERATIONS	30	$15,674	$252,044
66	WM	6211+	4301	DOC/S&H/WM TRAING	30	$1,114	$253,158
67	WM	2611	4302	LLW DISPOSAL FACILITY	30	$319	$253,477
68	SS	6311C	6311	ENVIRONMENTAL MONITOR (NOAA) (d/t/p)	60	$650	$254,127
69	SS	6311B	6311	STORES INVENTORY (d/t/p)	60	$290	$254,417
70	SS	63176	63176	EMER RESPONSE FAC (d/t/p)	60	$2,927	$257,344
71	SS	[illegible]3181	63181	HPIL (d/t/p)	60	$2,350	$259,694
72	WMNU	B22	6313	WORK CONTROL (d)	60	$1,155	$260,849
73	WMNU	A24	6329	ELECT/UTIL SYS UPGR (d/t/p)	60	$13,426	$274,275
74	WM	240R +	4311	RWMC LLW OPS	30	$15,669	$289,944
75	WM	6211+	4301	DOC/S&H/WM TRAING	30	$1,114	$291,058
76	WM	1631 +	4309	WCSF	30	$10,500	$301,558
77	WM	240P +	4311	LLW SUPPORT	30	$2,533	$304,091

EM FY-97 Integrated Priority List

Integrated Rank	Org	Act. #	ADS. #	Title	Funding Source	FY97 ($K)	Cum. Cost ($K)
78	WM	6212A	4301	WAC AUDIT	30	$253	$304,344
79	WMNU		6313	MAINTENANCE (d)	60	$6,404	$310,748
80	SS	63180	63180	ELECTRICAL DISTRIBUTION (d/t/p)	60	$8,412	$319,160
81	WM	6315	4313	ENVIRONMENT SURVEILLANCE	30	$2,714	$321,874
82	WM	22SS	4301	PSPI TREATMENT	30	$656	$322,530
83	WM	220T +	4310	MW TREATMENT	30	$6,421	$328,951
84	WM	6211+	4301	DOC/S&H/WM TRAING	30	$1,114	$330,065
85	WMNU	F121/122	1008	SODIUM WASTE PROCESSING DEVEL.	30	$3,121	$333,186
86	SS	6311F	6311	INTEGRATED FACILITY PLANNING (d/t/p)	60	$3,050	$336,236
87	SS	6311A	6311	S&H CORRECTIVE ACTIONS (d)	60	$625	$336,861
88	SS	6311D	6311	PROGRAM MANAGEMENT/DVLPMT (d/t/p)	60	$1,920	$338,781
89	WMNU	C115	6343	ROVER DEACTIVATION (d)	60	$5,119	$343,900
90	WMNU	6342A	6342	PBF/INACTIVATION (non-defense) (d)	60	$2,082	$345,982
91	WMNU	C12	6344	WCF DEACTIVATION (d)	60	$3,000	$348,982
92	WMNU		6315	QA PROGRAM SUPPORT (d)	60	$1,600	$350,582
93	WMNU	C132	6345	SEPARATIONS DEACTIVATION (d/t/p)	60	$150	$350,732
94	SS/NU	63179B	63179	LINE ITEM PLANING	60	$330	$351,062
95	SS	6341	6341	FDI (d)	60	$4,250	$355,312
96	WMNU	9999	6331	PBF S & M (non defense) (t/p)	60	$420	$355,732
97	WMNU	C22	6332	ICPP S & M (t/p)	60	$1,091	$356,823
98	SS	6311E	6311	EMERGENCY PREPAREDNESS (t/p)	60	$280	$357,103
99	WMNU	6342B	6342	ARMF/CFRMF (non defense) (t/p)	60	$45	$357,148
100	WMNU	6342A	6342	MTR/DEACTIVATION (non defense) (t/p)	60	$349	$357,497
101	WMNU	C115	6343	ROVER DEACTIVATION (t/p)	60	$1,204	$358,701
102	WMNU	6342A	6342	PBF/INACTIVATION (non-defense) (t/p)	60	$760	$359,461
103	WMNU	C12	6344	WCF DEACTIVATION (t/p)	60	$752	$360,213
104	SS/NU	63171Z	63171	SITEWIDE GPPS (t/p)	60	$1,735	$361,948
105	WMNU	A12	6313	UTILITY OPERATIONS (t/p)	60	$1,561	$363,509
106	ER	3KNB32000	28EG 111E1(P)	WAG 1-10 COMP. RI/FS	40	$1,379	$364,888
107	ER	3XPB9000	111E1(P)	PS ERPC	40	$4,580	$369,468
108	ER	3XLA70000	41EG 111E1(P)	WAG 10-04 COMP. RI/FS	40	$1,500	$370,968
109	ER	3XW041000	40EG 111E1(P)	WAG 7 COMP. RI/FS	40	$1,889	$372,857
110	DOE-ID			DOE PROGRAM DIRECTION (RESL)	20	$868	$373,725
111	ER	3XP701000	111E1(P)	PS QUALITY COMP. ASSURANCE	40	$1,600	$375,325
112	ER	3XPC01000	111E1(P)	PS SYSTEM PLANNING & CONTROL	40	$900	$376,225
113	ER	4417	1306WN 111E1(P)	D&D CP 709/734/631	40	$950	$377,175
114	ER	3KNTSA000	51EG 111E1(P)	D&D TAN TSF	40	$576	$377,751
115	ER	3XCB30000	34EG 111E1(P)	WAG 4-12 LANDFILLS (d/t)	40	$4,624	$382,375
116	ER	3KNA2R000	48EG 111E1(P)	D&D ARA II	40	$1,679	$384,054
117	ER	4419	1307WN 111E1(P)	D&D CPP 640	40	$134	$384,188
118	ER	3KNAC1000	52EG 111E1	D&D ARA I	40	$2,632	$386,820

EM FY-97 Integrated Priority List

Integrated Rank	Org	Act. #	ADS #	Title	Funding Source	FY97 ($K)	Cum. Cost ($K)	
119	ER	4418	1305WN 111E1(P)	D&D SFE 720/740	40	$143	$386,963	
120	ER	44211	1308WN 111E1(P)	D&D CPP601	40	$135	$387,098	
121	ER	3XP901000	111E1(P)	PS EM ANALYSIS/INTEGRATION	40	$1,564	$388,662	
122	SS	6311G	6311	OSO (t)	60	$1,164	$389,826	
123	WMNU		6315	ES&H PROGRAM SUPPORT (t)	60	$1,790	$391,616	
124	WMNU		6314	ENGINEERING SUPPORT (t)	60	$2,980	$394,596	
125	WMNU	B121/122	6313	GENERAL SERVICES (t)	60	$2,064	$396,660	
126	WMNU	F331	1012	SPENT FUEL TECHNOLOGY	30	$4,966	$401,626	
127	SS/NU	6312C	6312	GPCE BASE (t/p)	60	$1,630	$403,256	
128	WMNU		6314	ADMIN SUPPORT (t)	60	$50	$403,306	
129	WMNU		6313	MAINTENANCE (t)	60	$1,309	$404,615	
130	SS	6311A	6311	S&H CORRECTIVE ACTIONS (t/p)	60	$875	$405,490	
131	SS	6341C	6341	FDI (t/p)	60	$1,060	$406,550	
132	WM	220T +	4310	WERF	30	$6,000	$412,550	
133	ER	3XCB30000	34EG 111E1(P)	WAG 4-12 LANDFILLS (p)	40	$6,000	$418,550	
134	WMNU		6313	WORK CONTROL (t)	60	$270	$418,820	
135	WMNU		6315	QA PROGRAM SUPPORT (t)	60	$376	$419,196	
136	WMNU	D114	1010	WATER QUALITY RESTORATION	30	$1,034	$420,230	
137	ER	44161	1309WN 111E1(P)	D&D WCF	40	$135	$420,365	
138	ER	x	28EG 111E1(P)	WAG 1 10R LANDFILL REMOVAL	40	$85	$420,450	
139	ER	3XWC4A000	40EG 111E1(P)	WAG 7 PIT 9	40	$64,200	$484,650	Requested
140	WMNU	F21	1011	'NATIONAL SPENT FUEL	30	$7,343	$491,993	Target
141	WMNU	E24	1004	STRESS REDUCTION OF BIN SET #1	30	$5,150	$497,143	
142	WMNU	E27	1004	SODIUM WASTE PROCESSING FACILITY	30	$2,970	$500,113	
143	WMNU	F331	1012	SPENT FUEL TECHNOLOGY (p)	30	$1,500	$501,613	
144	WM	811A	4312	SPENT FUEL OPS - TAN (p)	30	$900	$502,513	
145	WMNU	F131/132X	1008	HLW IMMOBILIZATION	30	$2,179	$504,692	
146	WM	6226	4301	TRANSPORTATION COMPLIANCE	30	$2,775	$507,467	
147	WM	6312	4311	RCRA PERMITTIMG & CLOSURES	30	$3,021	$510,488	
148	WM	6312	4313	RCRA COMPLIANCE REPORTING	30	$78	$510,566	
149	WM	6312	4302	FFCA IMPLEMENTATION	30	$1,128	$511,694	
150	WM	6313B	4313	GROUNDWATER	30	$2,852	$514,546	
151	WM	6101	4301	PLANNING & INTEGRATION	30	$1,493	$516,039	
152	WM	6313A	4313	SURFACE WATER	30	$747	$516,786	
153	WM	6318	4313	COMPLIANCE MONITORING	30	$1,843	$518,629	
154	WMNU	D14	1010	EM 30 ES&H CORRECTIONS	30	$668	$519,297	
155	WMNU	E18	1001	EM 30 ES&H CORRECTIONS	30	$438	$519,735	
156	WMNU	E174	1001	EM30 QUALITY ASSURANCE	30	$637	$520,372	
157	WMNU		6313	UTILITY OPERATIONS(p)	60	$643	$521,015	
158	WMNU	D112	6316	CPP 651 SNM STOR OPS (p)	60	$210	$521,225	
159	WMNU		6315	ES&H PROGRAM SUPPORT (p)	60	$3,683	$524,908	
160	WMNU		6314	ENGINEERING SUPPORT (p)	60	$874	$525,782	

EM FY-97 Integrated Priority List

Integrated Rank	Org	Act. #	ADS. #	Title	Funding Source	FY97 ($K)	Cum. Cost ($K)
161	WMNU	F111	1008	SYSTEMS ANALYSIS	30	$1,653	$527,435
162	WMNU	F121/122	1008	NA BEARING WASTE PROCESS	30	$5,700	$533,135
163	WMNU		6313	MAINTENANCE (p)	60	$814	$533,949
164	WMNU		6314	ADMIN SUPPORT (p)	60	$1,358	$535,307
165	WMNU	B1641	6313	GENERAL SERVICES (p)	60	$1,569	$536,876
166	WMNU	C115	6343	ROVER DEACTIVATION (p)	60	$22	$536,898
167	SS	6312E	6312	GPCE IRM UPGRADE (p)	60	$5,570	$542,468
168	WM	1611 +	4302	IWPF	30	$4,816	$547,284
169	WMNU	F17	1004	WASTE IMMOBILIATION FACILITY	30	$15,200	$562,484
170	WMNU	D113/114/115	1010	PB FUEL TRANSFER, IFSF FUEL RECEIPT	30	$3,267	$565,751
171	WMNU	D135	1010	EM30 ENVIR. ASSURANCE	30	$232	$565,983
172	WMNU	D24	1010	FSA RERACK PROJECT	30	$4,293	$570,276
173	WMNU	D131	1010	PROC. & DOCUMENT SERV.	30	$802	$571,078
174	WMNU	E24	1004	CALCINE RECOVERY BIN SET #1	30	$1,500	$572,578
175	WMNU	E224/278	1003	ICPP GPP	30	$4,910	$577,488
176	WMNU	E111B	1001	DESIGN & PROCURE COUPON RACKS	30	$176	$577,664
177	WMNU	E114/111C	1001	REMOTE TANK INSPECTION	30	$531	$578,195
178	WMNU	E121/123/125/152	1001	WASTE OPS. UPGRADES	30	$1,078	$579,273
179	WMNU	E14	1001	SPARE PARTS	30	$130	$579,403
180	WMNU	B85	1004	LAB EXPANSIONS & UPGRADES	30	$250	$579,653
181	WMNU	E175	1001	NUC.OPS. TRAINING	30	$522	$580,175
182	WM	6225	4301	SAFETY ANAL. REPORTING & TECH	30	$377	$580,552
183	WM	6316	4313	ENVIRONMENTAL DATABASES	30	$654	$581,206
184	WM	6401A	4103	POLLUTION PREVENT. REG.	30	$1,295	$582,501
185	WM	6104	4301	WASTE TYPE MNGRS	30	$410	$582,911
186	WM	6224	4301	ISRC	30	$475	$583,386
187	WMNU	E133	1001	WASTE MINIMIZATION	30	$149	$583,535
188	WMNU	E282	1004	HEEL REMOVAL	30	$3,520	$587,055
189	WM	6401	4103	POLUTION PREVENT.DISCR.	30	$1,800	$588,855
190	WMNU	F23	1011	NATIONAL SPENT FUEL (PLANNING)	30	$2,829	$591,684
191	WM	6314	4313	NEPA SUPPORT	30	$275	$591,959
192	WMNU	E26	1004	SERVICE WASTE CLOSED LOOP	30	$9[illegible]5	$592,944
193	WMNU	E172	1001	EM ORDERS COMPL. REV.	30	$2,504	$595,448
194	WM	6321	4314	EIS SUPPORT FOR NON-EM PROGRAMS	30	$2,953	$598,401
195	WM	6227	4301	PUBLIC PARTICIPATION	30	$250	$598,651
196	WM	6103B	4301	ENVIRONMENT INTEGRATION SYS.	30	$481	$599,132
197	SS	6311I	6311	OSO (p)	60	$1,862	$600,994
198	WMNU		6313	WORK CONTROL (p)	60	$1,982	$602,976
199	WMNU		6315	QA PROGRAM SUPPORT (p)	60	$2,031	$605,007

DOE/NV ENVIRONMENTAL RESTORATION AND WASTE MANAGEMENT
FY 97 INTEGRATED PRIORITY LIST
as of April 17, 1995

Nevada

DECREMENT CASE		
Program Direction	ADS 199-18	$3,648
	ADS 3031-1	$2,251
Program/Regulatory Compliance	ADS 201, 202	$7,331
	ADS 331,344	$8,373
Waste Operations	ADS 333,343	$5,038
Groundwater Data Acquisition	ADS 212	$18,012
Industrial Site Remediation	ADS 214	$5,575
Decontamination and Decommissioning	ADS 221	$50
Performance Assessments	ADS 345	$2,503
Off-Sites	ADS 240	$2,246
Waste Minimization	ADS 332	$200
TOTAL DECREMENT CASE		$55,227
TARGET CASE		
Contaminated Soils Remediation	ADS 211	$4,595
Nevada Analytical Services	NV-2602	$1,637
Groundwater Data Analysis and Modeling	ADS 212	$2,036
Regulatory Compliance	ADS 344	$274
Waste Operations	ADS 333	$111
Waste Acceptance Oversight	ADS 341	$2,856
TOTAL TARGET CASE		$66,736
PLANNING CASE		
Contaminated Soils Remediation	ADS 211	$8,306
Decontamination and Decommissioning	ADS 221	$417
Greater Confinement Disposal	ADS 346	$1,518
Waste Minimization	ADS 332	$2,072
Construction	ADS 334,335,339	$3,575
Program Direction	ADS 3031-1	$200
Program/Regulatory Compliance	ADS 201,202	$835
	ADS 331,344	$11,589
Groundwater Data Aquisition	ADS 212	$3,601
Industrial site Remediation	ADS 214	$9,888
Nevada Transportation	NV-2603	$500
Off-Sites	ADS 240	$3,188
PROPOSED DOE/NV PROGRAM		$110,228
Waste Operations	ADS 333,343	$2,109
Performance Assessments	ADS 345	$2,103
Waste Acceptance Oversight	ADS 341	$1,244
Facilities Transition	NV 5400	$460
Nevada Emergency Management*	NV-2601	$1,050
Nevada Transportation*	NV-2603	$9,500
Transportation Program Direction*	NV-2604	$360
Cost Management	NVHQ-2401	$40
Analysis,Education & Risk Mgmt*	NV-4201	$2,201
TOTAL PLANNING CASE		$129,292

*Funding has not been identified by HQ for these activities.

OAKLAND

Priority Category	Program Office	Site	ADS No. or TDD	Activity Description	Category Cost	Item Cost	Cumulative Cost
1	**Worker and Public H&S Requirements (Risk Management)**				$19,509		
	EM-40	ETEC	1488-01	ETEC S&M (HOT CELL)		$500	$500
	EM-40	ETEC	1488-03	ETEC Safety		$150	$650
	EM-40	ETEC		ETEC landlord S&M		$700	$1,350
	EM-40	GA	1484-02	GA S&M		$50	$1,400
	EM-40	GA	1484-03	GA Safety		$100	$1,500
	EM-40	GE	1486-02	GE Safety (S&M)		$105	$1,605
	EM-40	LBL	1482-31	LBL Safety		$200	$1,805
	EM-40	LEHR	1485-03	LEHR Safety		$373	$2,178
	EM-40	LLNL	1481-30	LLNL ER Safety		$300	$2,478
	EM-40	LLNL	1481-01	LLNL Main Site Safety		$927	$3,405
	EM-40	LLNL	1481-04	LLNL Site 300 RCRA Safety		$85	$3,490
	EM-40	LLNL	1481-03	LLNL Site 300 Safety		$53	$3,543
	EM-40	LLNL	1481-05	LLNL S300 GSA Safety		$164	$3,707
	EM-40	LLNL	1481-06	LLNL S300 B834		$103	$3,810
	EM-40	LLNL	1481-07	LLNL S300 Pit 6 Safety		$49	$3,859
	EM-40	LLNL	1481-08	LLNL S300 HE Process Safety		$103	$3,962
	EM-40	LLNL	1481-09	LLNL S300 B850/Pits 3&5 Safety		$110	$4,072
	EM-40	LLNL	1481-10	LLNL S300 B832 Cyn Safety		$105	$4,177
	EM-40	SLAC	1483-31	SLAC Safety		$100	$4,277
	EM-30	ETEC	Disposal	RMDF Rad Waste Disposal		$178	$4,455
	EM-30	ETEC	Storage	HWCA Maint. & Ops		$10	$4,465
	EM-30	ETEC	Storage	B/029 Ops		$40	$4,505
	EM-30	ETEC	Storage	RMDF Maint. & Ops		$598	$5,102
	EM-30	LBL	COO	Procedure Writing		$76	$5,178
	EM-30	LBL	COO	Safety/Compliance		$869	$6,047
	EM-30	LBL	COO	Facility Repairs & Routine HC		$63	$6,110
	EM-30	LBL	COO	Radiological Samples Analysis		$135	$6,245
	EM-30	LBL	Disposal	Radioactive Waste Trans. & Disposal		$101	$6,346
	EM-30	LBL	Storage	Haz Waste Handling		$416	$6,762
	EM-30	LBL	Storage	Mixed and Rad Pickups/Hndl.		$659	$7,421
	EM-30	LBL	Storage	Spill Response and Safety Supplies		$60	$7,481
	EM-30	LBL	Storage	RMMA Waste Management		$219	$7,700
	EM-30	LEHR	Storage	Storage Facility Operations		$95	$7,795
	EM-30	LLNL	COO	Operations/Safety		$1,997	$9,792
	EM-30	LLNL	COO	Facility Mgmt		$2,428	$12,220
	EM-30	LLNL	COO	Critical Maint. & Upgrades		$1,349	$13,569
	EM-30	LLNL	Disposal	Rad Waste Disposal		$2,560	$16,129
	EM-30	LLNL	GPP	HWM Facility Safety Upgrades		$500	$16,629
	EM-30	LLNL	Storage	Haz Waste Inventory Maint.		$212	$16,841
	EM-30	LLNL	Storage	Haz Waste Inventory Ops		$512	$17,353
	EM-30	LLNL	Storage	Rad Waste Projects/Inventory Maint.		$431	$17,784
	EM-30	LLNL	Storage	Rad Waste Inventory Ops.		$513	$18,297
	EM-30	SLAC	COO	Safety Procedures		$12	$18,309
	EM-30	SLAC	COO	Continuity of Ops C E		$10	$18,319
	EM-30	SLAC	Rad W Stor	Rad Waste Storage CE (gamma det)		$7	$18,326
	EM-30	SLAC	Rad W T&D	Rad Waste T&D (LLW)		$352	$18,678
	EM-30	SLAC	Storage	LLW Storage		$559	$19,237
	EM-30	SLAC	Storage	MW Storage		$45	$19,282
	EM-30	SLAC	Storage	LLW Storage C E		$227	$19,509
							$19,509
2	**Compliance with Federal or Local Laws**				$50,609		
	EM-40	DOE/OAK	199-18	DOE Program Direction		$4,585	$24,094
	EM-40	LBL	1482-11	LBL Soil and Groundwater Char.		$1,950	$26,044
	EM-40	LBL	1482-12	LBL HWHF Closure		$1,093	$27,137
	EM-40	LBL	1482-31	LBL PM		$917	$28,054
	EM-40	LEHR	1485-01	LEHR Soil and Groundwater Char.		$2,545	$30,599
	EM-40	LEHR	1485-03	LEHR PM		$558	$31,157
	EM-40	LLNL	1481-30	LLNL Core PM		$3,262	$34,419
	EM-40	LLNL	1481-01	Regulatory Compliance		$2,445	$36,864
	EM-40	LLNL	1481-01	Treatment Facilities		$4,525	$41,389
	EM-40	LLNL	1481-03	Site 300 wide monitoring		$397	$41,786
	EM-40	LLNL	1481-05	GSA Mon., ROD, and RAs		$1,236	$43,022
	EM-40	LLNL	1481-06	B834 GW mon., report. and RA		$774	$43,796
	EM-40	LLNL	1481-07	Pit 6 GW Sampling and reporting		$371	$44,167
	EM-40	LLNL	1481-08	HE PA monitoring and PP		$774	$44,941
	EM-40	LLNL	1481-09	OU5 mon., FS, and Draft PP		$828	$45,769

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Only activities within Categories 2A and 3 are prioritized

Priority Category	Program Office	Site	ADS No. or TDD	Activity Description	Category Cost	Item Cost	Cumulative Cost
	EM-40	LLNL	1481-10	B832 Canyon GW Mon. and reporting		$790	$46,559
	EM-40	LLNL	1481-04	Begin HE Burn Pit closure		$641	$47,200
	EM-40	SLAC	1483-31	SLAC PM		$150	$47,350
	EM-30	DOE/OAK	3031	DOE Program Direction		$5,147	$52,497
	EM-30	DOE/OAK	3912-03	Federal Facility Compliance Act		$625	$53,122
	EM-30	ETEC	COO	Program Management		$300	$53,422
	EM-30	ETEC	Disposal	B/133 Waste Disposal		$155	$53,577
	EM-30	ETEC	Disposal	HWCA Waste Disposal		$42	$53,619
	EM-30	ETEC	Disposal	RMDF Mixed Waste Disposal		$533	$54,151
	EM-30	ETEC	Treatment	WVN System Operation		$300	$54,451
	EM-30	ETEC	Treatment	B/133 Operations		$442	$54,893
	EM-30	ETEC	Treatment	FFCA Implementation		$294	$55,187
	EM-30	LBL	COO	Program Administration		$1,461	$56,648
	EM-30	LBL	COO	Part B Permit Modifications		$60	$56,708
	EM-30	LBL	COO	Regulatory Interaction		$449	$57,157
	EM-30	LBL	COO	Fees/Fines/Taxes		$54	$57,211
	EM-30	LBL	COO	Analytical Lab and TSDF Audits		$46	$57,257
	EM-30	LBL	Disposal	Haz Waste T&Disposal		$649	$57,906
	EM-30	LBL	Disposal	Med Waste T&Disposal		$85	$57,991
	EM-30	LBL	Disposal	Mixed Waste T&Disposal		$184	$58,175
	EM-30	LBL	Treatment	Capital Equipment (Mixer, etc.)		$152	$58,327
	EM-30	LBL	Treatment	Silver Recovery Program		$13	$58,340
	EM-30	LEHR	Mgmt	Program Management		$23	$58,363
	EM-30	LEHR	Ship/Disp.	Shipping and Disposal		$82	$58,445
	EM-30	LLNL	COO	Program Administration		$2,731	$61,176
	EM-30	LLNL	COO	Regulatory Compliance		$1,472	$62,648
	EM-30	LLNL	Disposal	Haz Waste Disposal		$2,517	$65,165
	EM-30	LLNL	Treatment	Haz Waste Proc.		$607	$65,772
	EM-30	LLNL	Treatment	Mixed Waste Proc.,CE&IC		$1,294	$67,066
	EM-30	LLNL	Treatment	Process Engr. Studies(Mixed)		$985	$68,051
	EM-30	SLAC	COO	General Management		$386	$68,437
	EM-30	SLAC	COO	Regulatory Interactions		$24	$68;461
	EM-30	SLAC	HW T&D	HW T&D Operations & Proc.		$397	$68,858
	EM-30	SLAC	HW T&D	HW T&D Disposal		$975	$69,833
	EM-30	SLAC	HW T&D	HW T&D Transportation		$272	$70,105
	EM-30	SLAC	Rad W T&D	Rad Waste T&D (Mixed Waste)		$13	$70,118
2A	**Compliance w/ Negotiated Agreements & Contracts (Stakeholders)**				**$21,215**		**$70,118**
	EM-60	ETEC		ETEC LANDLORD (OTHER)		$1,997	$72,115
	EM-40	ETEC	1488-20	ETEC RMDF Closure		$625	$72,740
	EM-40	ETEC	1488-01	ETEC GW Monitoring		$100	$72,840
	EM-30	LLNL	Disposal	Waste Certification (Legacy/TRU)		$1,298	$74,138
	EM-40	ETEC	1482-12	ETEC D&D		$572	$74,710
	EM-40	LLNL	1481-01	Treatment Facilities/capture		$1,182	$75,892
	EM-40	LEHR	1485-01	LEHR Soil & Ground Water		$904	$76,796
	EM-40	GA	1484-02	GA Surveillance and Maintenance		$550	$77,346
	EM-40	GA	1484-02	GA Nuclear Safety		$600	$77,946
	EM-40	SLAC	1483-11	SLAC Offsite Removal Action		$111	$78,057
	EM-40	LLNL	1481-01	Building 292 Monitoring		$210	$78,267
	EM-40	DOE/OAK	1487-1	DOE State Grants		$660	$78,927
	EM-40	ETEC	1488-03	ETEC Program Management		$350	$79,277
	EM-30	ETEC	COO	Admin. Program Management		$300	$79,577
	EM-30	SLAC	COO	Admin. and Public Interactions		$429	$80,006
	EM-40	GA	1484-03	GA Program Management		$400	$80,406
	EM-40	DOE/OAK	Prgm Cont'l	ERD Program Control		$865	$81,271
	EM-30	DOE/OAK	3912-01/02	WMD Program Control		$1,220	$82,491
	EM-40	LLNL	1481-05	GSA RAIP		$300	$82,791
	EM-40	LLNL	1481-06	B834 RAIP		$155	$82,946
	EM-40	LLNL	1481-07	Pit 6 ROD		$180	$83,126
	EM-40	LLNL	1481-08	HE Process Area Draft ROD		$76	$83,202
	EM-40	LLNL	1481-09	Begin B854 Char.		$166	$83,368
	EM-40	LLNL	1481-10	B832 Canyon Draft FS		$159	$83,527
	EM-40	SLAC	1483-11	SLAC Characterization		$381	$83,908
	EM-30	ETEC	WMin	Waste Minimization		$200	$84,108
	EM-30	LBL	WMin	Waste Minimization		$400	$84,508
	EM-30	LLNL	WMin	W. Min/Pollution Prevention		$1,055	$85,563
	EM-30	SLAC	WMin	Waste Minimization		$215	$85,778

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Priority Category	Program Office	Site	ADS No. or TDD	Activity Description	Category Cost	Item Cost	Cumulative Cost
	EM-30	LBL	COO	Chemical Samples Analysis		$123	$85,901
	EM-30	LLNL	COO	Regulatory Req. Info. System		$1,516	$87,417
	EM-40	LLNL	1481-30	Target PM		$629	$88,046
	EM-40	LLNL	1481-04	Continue HE Burn Pit Closure		$128	$88,174
	EM-40	GA	1484-02	GA D&D		$1,300	$89,474
	EM-30	LBL	COO	Waste Acceptance & Tracking		$237	$89,711
	EM-30	LBL	COO	LBL QA/QC		$87	$89,798
	EM-30	LBL	COO	Waste Tracking Data Base		$287	$90,085
	EM-30	LLNL	COO	QA Mgmt. & Info System		$2,071	$92,156
	EM-40	ETEC	1488-01	ETEC GW Cleanup		$800	$92,956
	EM-40	ETEC	1488-01	ETEC B-056 Cleanup		$200	$93,156
	EM-30	LLNL	COO	Environmental Chemistry Comp.		$507	$93,663
	EM-30	LBL	COO	Planning		$292	$93,955
3	Other Drivers (Cost Efficiency, Stakeholders)				$44,646		$93,955
	EM-30	SLAC	COO	Quality Assurance		$42	$93,997
	EM-30	LLNL	DWTF/LI Cons	Decon. & Waste Treat. Facility		$10,000	$103,997
	EM-30	LLNL	MWMF/CE&OE	Mixed Waste Treat. Tech. Dev.		$9,000	$112,997
	EM-60	DOE-OAK		EM-60 planning		$431	$113,428
	EM-40	SLAC		Small Sites Initiative		$251	$113,679
TARGET	EM-40	ETEC		Small Site Initiative		$500	$114,179
	EM-40	LEHR	1485-01	LEHR Soil & Ground Water		$90	$114,269
	EM-40	LLNL	1481-01	Remedial Design Report #4		$400	$114,669
	EM-40	LLNL	1481-01	Trailer 5475 GW		$1,029	$115,698
	EM-40	LLNL	1481-01	ROD 5 yr. review		$350	$116,048
	EM-40	LLNL	1481-01	TFA extensions		$990	$117,038
	EM-40	LLNL	1481-01	Source Investigation Drilling		$310	$117,348
	EM-40	LLNL	1481-01	TFC SE Pipeline		$465	$117,813
	EM-40	LLNL	1481-01	MS Contingency Plan		$280	$118,093
	EM-40	LLNL	1481-03	Site 300 RI Modelling		$100	$118,193
	EM-40	LLNL	1481-04	Complete HE Burn Pit Closure		$346	$118,539
	EM-40	LLNL	1481-05	Complete GSA RD's		$500	$119,039
	EM-40	LLNL	1481-06	Building 834 RD		$668	$119,707
	EM-30	LBL	Disposal	Radioactive Waste Trans. & Disposal		$320	$120,027
	EM-30	SLAC	Rad W T&D	Addtl Rad Waste T&D (LLW)		$352	$120,379
	EM-30	LLNL	COO	Tritium Glovebox/Waste Cert.		$2,500	$122,879
	EM-30	LBL	WMin	Waste Minimization		$171	$123,050
	EM-30	LLNL	WMin	Waste Minimization		$90	$123,140
	EM-30	LLNL	DWTF	Decontamination Waste Treatment Facility		$1,000	$124,140
	EM-30	LLNL	MWMF	Mixed Waste Mixed Facility		$4,000	$128,140
	EM-30	LLNL	COO	Wrk. Place Upgrades/OE		$594	$128,734
	EM-40	LBL	1488-20	LBL HWHF Closure		$646	$129,380
	EM-30	LBL	COO	Facility Repairs & Routine HC		$63	$129,443
	EM-40	GA	1484-02	GA D&D		$1,000	$130,443
	EM-40	LLNL	1481-07	Pit 6 RAIP		$800	$131,243
	EM-40	LLNL	1481-08	HEPA final ROD		$247	$131,490
	EM-40	LLNL	1481-09	OU 5 ROD		$536	$132,026
	EM-40	LLNL	1481-10	B832 Canyon Final FS		$426	$132,452
	EM-40	LLNL	1481-30	Planning PM		$1,696	$134,148
	EM-30	DOE/OAK	AIP	Agreement in Principle		$2,000	$136,148
	EM-30	ETEC	Treatment	WVN System Operation		$660	$136,808
	EM-30	LBL	COO	Safety/Compliance		$99	$136,907
	EM-30	LBL	COO	Training		$160	$137,067
	EM-30	LBL	COO	Program Administration		$8	$137,075
	EM-30	LBL	COO	Waste Tracking Data Base		$111	$137,186
	EM-40	LEHR	1485-03	LEHR Project Management		$80	$137,266
	EM-40	LEHR	1485-02	LEHR Dog pen D&D		$535	$137,801
	EM-40	GTF		Geothermal Test Facility-x		$500	$138,301
	EM-30	LBL	COO	Waste Acceptance & Tracking		$7	$138,308
	EM-30	LBL	COO	Planning		$44	$138,352
	EM-30	LBL	COO	Total Quality Management		$141	$138,493
	EM-30	LBL	COO	Operations Projects		$150	$138,643
	EM-30	LBL	Treatment	Capital Equipment (Mixer, etc.)		$135	$138,778
	EM-30	LLNL	GPP	Contingency		$50	$138,828
	EM-30	LBL	GPP	Office Space		$400	$139,228

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OAK RIDGE OPERATIONS OFFICE
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INTEG. RANK	PGM*	ACTIVITY	B & R CODE	M $	FT	FY 97 COST ESTIMATE	FY 97 CUMULATIVE	DESCRIPTION
1	WM	DOE DIRECT	EW3160000	9,000	OE	$9,000	$9,000	This task consists of DOE management and oversight of all WM/CA activities on the ORR Funding is provided for existing DOE FTEs and technical support subcontractors only, no funding for additional FTEs to enhance DOE oversight
2	ER	DOE DIRECT	EW2010	14,637	OE	$14,637	$23,637	DOE Prime contractors program support activities and the ER community relations program Funding includes DOE FTE's
3	EM-60	PROGRAM INTEGRATION	EW7001000	569	OE	$569	$24,206	Includes activities to accomplish pgm planning, identify requirements, & develop programmatic documentation (i e proj requirement docs, proj execution plans, baselines, ADS's) & pgm reporting for Cent EM60, IFDP & HIRanking facilities at ORNL & Y-12
4	TRANS	TRANSPORTATION PROGRAM DIRECTION	EW4050	100	OE	$100	$24,306	This task provides DOE management and oversight of all CPC activities in ORO Funding is provided for one DOE FTE and zero technical contractors
5	ER	LANDLORD	EW2010	4,401	OE	$4,401	$28,707	Consists of Landlord capital equipment and construction activities at the K-25 Site
6	ER	PROGRAM MANAGEMENT	EW2010	6,833	OE	$6,833	$35,540	Consists of program management cost associated with MSA-OR
7	ER	ERWM TECHNICAL PROGRAMS	EW2010	2,554	OE	$2,554	$38,094	Several technical and waste management programs such as analytical support, ER waste mgt and T/S/D support, ER groundwater program, off-site shipments contract mgt , records mgt , land use planning, and long term reservation wide monitoring
8	ER	AGREEMENT-IN PRINCIPLE	EW2010	2,245	OE	$2,245	$40,339	Provides funding for the Tennessee, Kentucky, and Ohio Agreements in principle
9	ER	Y-12 RPME	EW2010	4,948	OE	$4,948	$45,287	Consists of the Reduction of mercury in Plant Effluents Projects at the Y-12 Plant with potential NPDES Permit violations
10	ER	ORNL GUNITE TANKS/S I	EW2010	4,866	OE	$4,866	$50,153	Consists of remediation activities with the ORNL WAG 1 North and South Tank Farms, and surface impoundments
11	WM	LIQUID WASTE OPERATIONS	35EW31203 35EW31204 EW3120041 EW3120060 EW3131090	650 1,000 9,586 13,113 7,978	CE CE OE OE OE	$32,327	$82,480	Includes the operation, maintenance, & eqpt. for treatment of liquid & gaseous wastes Facilities/systems covered the LLLW sys, & process & non-radioactive liquid waste sys at ORNL, WETF, WTF, CPCF, LSF,& GWTF at Y-12 & CNF at K-25

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INTEG. RANK	PGM*	ACTIVITY	B & R CODE	M $	FT	FY 97 COST ESTIMATE	FY 97 CUMULATIVE	DESCRIPTION
12	WM	FFA COMPLIANCE ACTIVITIES - ACTIVE SYSTEMS	EW3120045	3,601	OE	$3,601	$86 081	This task provides for the upgrade activities required by the FFA for the active LI LW system at ORNL including integrity testing, contingency planning, and the Bethel Valley FFA line item 15% productivity and M&O savings has been incorporated
13	WM	RCRA/TSCA/MIXED/CLASSIFIED STORAGE	35EW31206 EW3120041 EW3120060 EW3131090	294 1,321 7,270 7,255	CE OE OE OE	$16,140	$102,221	This task covers operation, maintenance, and eqpt for the storage of solid and liquid wastes regulated under RCRA and TSCA on the ORR A 10% productivity savings has been incorporated No funding is included for CONOPS improvements or DNFSB activities
14	WM	INDUSTRIAL/SLLW DISPOSAL	EW3120060 EW3130090 39EW31309 EW3120041	4,081 150 200 3,552	OE OE LI OE	$7,983	$110,204	This task includes the operation of sanitary and industrial wastes in landfills at Y-12 It also includes funding for the line item project, Ind LF V/VII, Phase II A 10% productivity savings has been incorporated No funding for CONOPS or DNFSB
15	WM	WASTE COLLECTION/TRANSPORTATION	EW3120041 EW3120060 EW3131090	2,219 2,542 5,139	OE OE OE	$9,900	$120,104	This task covers the collection/transportation of wastes from the generator to/among TSD facilities at the three Oak Ridge sites It also covers preparation of wastes for shipment off the ORR A 10% productivity savings is included No CONOPS or DNFSB
16	WM	TSCA BASE OPERATIONS	35EW31203 EW3120032	450 22,070	CE OE	$22,520	$142,624	This task covers the operation of the TSCA Incinerator, preparation of hazardous waste permit revision, & design for TSCA upgrade A 10% productivity savings is included This funding level will result in a 10% decrease in throughput & higher unit cost
17	WM	PRIVATE SECTOR TREATMENT PROGRAM	EW3120031 EW3120060 EW3130090	170 176 18,000	OE OE OE	$18,346	$160,970	This activity is the primary element in the Site Treatment Plan for the treatment of mixed wastes - the utilization of private sector expertise
18	ER	OFF-SITE PROGRAM	EW2010	6,369	OE	$6,369	$167,339	Consists of remediation activities associated with sites located off the DOE-OR reservation These sites include Lower East Fork Poplar Creek, Watts Bar and Atomic City Auto Parts
19	ER	9201-4 D&D	EW2010	2,580	OE	$2,580	$169,919	Consists of asbestos removal activities associated with D&D of 9201-4
20	ER	GROUNDWATER TREATMENT/RA S&M	EW2010	8,103	OE	$8,103	$178,022	Includes funding for routine groundwater treatment and surveillance and maintenance of remedial action sites at Y-12, ORNL, K-25, Portsmouth and Paducah

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INTEG. RANK	PGM*	ACTIVITY	B & R CODE	M S	FT	FY 97 COST ESTIMATE	FY 97 CUMULATIVE	DESCRIPTION
21	WM	RAD WASTE STORAGE	EW3120041 FW3120060 FW3131090	1,556 770 2,764	OE OE OE	$5,090	$183,112	This activity covers the storage of radioactive wastes on the OR,contaminated salvage yard operations, and planning for the Dry Cask Storage Facility LI A 10% productivity savings is included No funding for CONOPS or DNFSB improvements
22	ER	Y-12 FFA RA PROJECTS	EW2010	5,626	OE	$5,626	$188,738	Consists of FFA remedial action projects at Y-12 The sites include Chestnut Ridge, Poplar Creek, Upper East Fork Poplar Creek and Bear Creek Valley
23	ER	D&D S&M	EW2010	7,352	OE	$7,352	$196,090	Includes routine surveillance and maintenance of D&D facilities at Y-12, ORNL, K-25, Portsmouth and Paducah
24	WM	SAFETY DOCUMENT/H&S PROGRAMS	FW3120032 EW3120050 EW3120060 EW3131090	174 750 323 700	OE OE OE OE	$1,947	$198,037	This task provides for safety and health activities including those required by DOE orders (SARUP), activities in response to Price Anderson Amendment Act, and operation of the Filter Test Facility This level represents 75% of anticipated need
25	WM	FFA COMPLIANCE ACTIVITIES - INACTIVE SYSTEMS	EW3120045	3,894	OE	$3,894	$201,931	This task covers the compliance activities associated with the FFA for inactive portions of the ORNL LLLW system This funding level includes a 10% productivity savings plus schedule extension of some activities
26	WM	MIXED/HAZ WASTE TREATMENT/OFF-SITE DISPOSAL	EW3120050	259	OE	$259	$202,190	This activity includes the shipment of hazardous waste to commercial treatment/disposal facilities as required by RCRA A 10% productivity savings has been incorporated.
27	ER	ORNL GROUNDWATER/SURFACE WATER	EW2010	9,181	OE	$9,181	$211,371	Includes groundwater and surface water monitoring and remediation activities at ORNL.
28	WM	NDA/NDE OPERATIONS	EW3120041 FW3120060 FW3131090	989 1,603 900	OE OE OE	$3,492	$214,863	This task provides for Non-Destruction Assay and Examination (NDA/NDE) of wastes to determine rad content and to ensure proper TSD A productivity savings has been included, but this funding level represents only 50% of anticipated need
29	WM	POLLUTION PREVENTION	EW3110022 35EW31102	3,421 132	OE CE	$3,553	$218,416	This activity covers the planning of wastes minimization/pollution prevention activities for all generators No funding is provided for implementation of PP projects for WM facilities
30	WM	MIXED WASTE TREATMENT PROJECTS	EW3120060 EW3131090	295 234	OE OE	$529	$218,945	This task includes operation of mixed waste drum cleaning facilities

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INTEG. RANK	PGM*	ACTIVITY	B & R CODE	M $	FT	FY 97 COST ESTIMATE	FY 97 CUMULATIVE	DESCRIPTION
31	TRANS	OAK RIDGE TRANSPORTATION	EW50	2,645	OE	$2,645	$221,590	This task supports DOE in developing and implementing a safe, coordinated, comprehensive, and cost effective transportation program
32	WM	MELTON VALLEY STORAGE FACILITY CAP INC	39EW31309 EW3130090	6,345 450	LI OE	$6,795	$228,385	This project provides for additional storage capacity at the MVST facility, primarily in support of ER remedial actions at ORNL
33	WM	TRU WASTE PROGRAM	EW3130090 EW3120043	6,885 6,971	OE OE	$13,856	$242,241	This task covers CDR for TRU waste Packaging Facility, formerly referred to as WHPP, CH TRU Repackaging, TRU private sector processing, and other TRU activities
34	ER	ORNL OTHER FFA PROJECTS	EW2010	3,000	OE	$3,000	$245,241	Consists of other ORNL D&D and Remedial Action Projects including metal recovery facility, D&D, Old Hydrofracture Facility D&D and WAG 10(OHF) wells remediation
35	WM	WASTE TRACKING SYSTEMS	EW3120060 EW3131090	1,666 1,771	OE OE	$3,437	$248,678	This task covers activities for the operation and maintenance of systems to collect, validate, and report data associated with waste inventories as required by federal regulations This funding level is 50% of anticipated need
36	WM	MIXED WASTE PROGRAM/LDR FFCA	EW3120034	2,825	OE	$2,825	$251,503	The task includes waste characterization, and other program management and coordination activities as required by the FFCAct This funding level is only a portion of that reported in the STP
37	WM	WASTE CERTIFICATION	EW3120031 EW3120043 EW3120050 EW3120060	625 162 210 952	OE OE OE OE	$1,949	$253,452	This task covers waste certification and verification activities to ensure proper characterization of wastes by generators This funding level is 50% of that required to ensure proper certification
38	WM	FACILITY CLOSURES	EW3120060 EW3131090	1,913 335	OE OE	$2,248	$255,700	This task covers regulatory-required closure of 2 facilities, ILF V and CDL VI, and continuing S&M activities at K-1232
39	ER	TECHNICAL SUPPORT	EW2010	406	OE	$406	$256,106	Consists of technical support activities including risk assessment of groundwater
40	WM	ACTIVE GPP EXPENSE SUPPORT	EW3131090	120	OE	$120	$256,226	This task provides for WM program management and other support for ongoing GPPs This funding level represents a portion of anticipated need

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41	TRANS	OAK RIDGE ANALYTICAL SERVICES	EW9000	1,360	OE	$1,360	$257,586	Supports adaptation, assessment, and implementation of radiological field screening technology for expedited site characterization and D&D and state-of-the-art analytical methodologies modified for application to radioactive mixed waste
		DEFENSE DECREMENT FUNDING TOTAL					$257,586	
42	ER	DOE DIRECT		1,984	OE	$1,984	$259,570	Additional funding at the Target Level is for Federal FTEs due to a larger Program Total funding at Target is $16,621
43	WM	WASTE PROGRAM MANAGEMENT	35EW31205 EW3120031 EW3120043 EW3120050 EW3120060	47 208 250 4,273 250	CE OE OE OE OE	$5,028	$264,598	This task provides for ESWMO Central management staff, regulatory support, and central waste information services A 10% productivity savings and scope reductions are incorporated at this funding level
44	ER	OFF-SITE PROGRAM	EW2010	3,249	OE	$3,249	$267,847	Additional funding at the Target Level is for work at the Atomic City Auto Parts Total funding at Target is $9,618
45	EM-60	PROGRAM INTEGRATION	EW7001000	100	OE	$100	$267,947	Additional funding at the Target Level is for additional Program Integration to support a larger program Total funding at Target is $1,989
46	WM	LIQUID WASTE OPERATIONS	35EW31203	123	CE	$123	$268,070	Includes capital eqpt. in support of treatment of liquid & gaseous wastes Facilities/systems covered the LLLW sys, & process & non-radioactive liquid waste sys at ORNL; WETF, WTF, CPCF, LSF,& GWTF at Y-12 & CNF at K-25
47	WM	TSCA BASE OPERATIONS	EW3120032 EW3130090 39EW31309	519 85 1,000	OE OE LI	$1,604	$269,674	$519K includes funding for additional throughput for the TSCA Incinerator $85K OE, and $1,000 provides additional funding for the design of the off-gas system upgrade
48	WM	RAD WASTE STORAGE	FW3131090	627	OE	$627	$270,301	Funding provides expense support of Dry Cask Storage Line Item Project
49	TRANS	TRANSPORTATION PROGRAM DIRECTION	EW4050	10	OE	$10	$270,311	Additional funding at the Target Level is additional Government FTEs to support a larger Program Total funding at Target is $304
50	ER	Y-12 FFA RA PROJECTS	EW2010	4,932	OE	$4,932	$275,243	Additional funding at the Target Level is for work on the Chestnut Ridge OU-4 and additional work on the Lower East Fork Poplar Creek OU-1 Total funding at Target is $10,558

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51	WM	FFA COMPLIANCE ACTIVITIES-INACTIVE SYSTEMS	EW3120045	500	OE	$500	$275,743	This task provides remainder of funding for the compliance activities associated with the FFA for inactive portions of the ORNL LLLW system
52	WM	MIXED/HAZ WASTE TREATMENT/OFF-SITE DISPOSAL	EW3120050	668	OE	$668	$276,411	This activity includes the shipment of mixed waste to Envirocare A 10% productivity savings has been incorporated
53	WM	MIXED WASTE TREATMENT PROJECTS	EW3131090	223	OE	$223	$276,634	Provides funding for Mixed Waste Container Cleaning
54	WM	TRU WASTE PROGRAM	EW3120043	8,014	OE	$8,014	$284,648	This task covers MVST sludge retrieval and treatment and other TRU activities
55	WM	MIXED WASTE PROGRAM/LDR FFCA	EW3120031 EW3120034 EW3120043 EW3120060 EW3130090	150 2,635 150 150 1,524	OE OE OE OE OE	$4,609	$289,257	The task includes Site Treatment/Disposal Plan updates, Waste Minimization report, and program management and coordination, as required by the FFCAct
56	ER	ORNL OTHER FFA PROJECTS	EW2010	2,000	OE	$2,000	$291,257	Additional funding at the Target Level is for work on the ORNL Groundwater OU Total funding at Target is $5,000
57	WM	SPENT NUCLEAR FUEL PROGRAM	EW3110010	1,380	OE	$1,380	$292,637	This task covers activities for the management of Spent Nuclear Fuel on the ORR including EA/EIS support, continuation of vulnerability activities, and consolidation of SNF storage
58	WM	LLW TREATMENT/OFF-SITE DISPOSAL	EW3120050 EW3120060	2,944 765	OE OE	$3,709	$296,346	This task includes on-site operations (UCOF) and off-site activities - shipments to SEG for compaction / incineration and to NTS for disposal
59	WM	TSD FACILITY UPGRADES	EW3130090 39EW31309	50 1,000	OE LI	$1,050	$297,396	This task covers fire protection upgrades to OD 7 / 9811-1 (a key Y-12 RCRA storage facility)
60	ER	ORNL HIGH PRIORITY D&D	EW2010	2,500	OE	$2,500	$299,896	This includes D&D activities associated with the Fission Product Pilot Plant at ORNL There is no funding at Decrement Level
61	WM	LEGACY WASTE ANALYSIS	EW3131090 EW3120060	785 491	OE OE	$1,276	$301,172	This activity is for the analysis of legacy mixed from Y-12 and K-25 to feed the TSCA incinerator and is required to meet FFCAct burn plan goals This funding level represents 50% of anticipated need

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62	WM	ACTIVE GPP EXPENSE SUPPORT	EW3131090	250	OE	$250	$301,422	This task provides for WM program management and other support for ongoing GPPs This funding level represents only a portion of the anticipated need
63	TRANS	OAK RIDGE TRANSPORTATION	EW50	474	OE	$474	$301,896	Additional funding at the Target Level would fund additional Transportation Support to DOE HQ
64	WM	WM FACILITY UPGRADES	39EW31309	1,303	GPP	$1,303	$303,199	This tasks provides funding for only 6 of 8 GPP and 2 expense projects needed to modify / upgrade existing TSD facilities to meet regulatory requirements
65	WM	FFA COMPLIANCE ACTIVITIES	EW3120045	500	OE	$500	$303,699	This task covers expense-funded technical support for FFA activities and 1 FFA-related GPP
66	TRANS	OAK RIDGE ANALYTICAL SERVICES	EW9000	238	OE	$238	$303,937	Additional funding at the Target Level would fund additional Analytical Services to DOE HQ
		DEFENSE TARGET FUNDING TOTAL					**$303,937**	
67	ER	DOE DIRECT	EW2010	593	OE	$593	$304,530	Additional funding at Planning Level is for additional DOE FTEs and support due to a larger Program Total funding at Planning is $17,214
68	EM-60	PROGRAM INTEGRATION	EW7001000	59	OE	$59	$304,589	Additional funding at Planning Level is for additional Program Integration to support a larger program Total funding at planning is $2,084
69	WM	WASTE PROGRAM MANAGEMENT	EW3120050 EW3120060	798 1,250	OE OE	$2,048	$306,637	This activity for enhancements to the Central Waste Tracking System and other best management practices
70	ER	LANDLORD	EW2010	927	OE	$927	$307,564	Additional funding at Planning Level is for additional Capital Equipment and Construction, especially for the K-730 Substation construction Total funding at Planning is $4,869
71	ER	PROGRAM MANAGEMENT	EW2010	3,809	OE	$3,809	$311,373	Additional funding at Planning Level is for additional Program Support for Y-12 RA and D&D Pgm Mgmt due to their being larger programs at the planning level Additional funding is also included for Community Relations Total funding at Planning is $10,301

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72	ER	ERWM TECHNICAL PROGRAMS	EW2010	1,603	OE	$1,603	$312,976	Additional funding at Planning Level is for additional analytical Support and Waste T/S/D since the program is larger Total funding at Planning is $11,157
73	ER	AGREEMENT-IN PRINCIPLE	EW2010	449	OE	$449	$313,425	Additional funding at Planning Level is for additional State support due to a larger Program Total funding at Planning is $2,694
74	WM	TSCA BASE OPERATIONS	35EW31203 EW3120032	775 9077	CE OE	$9,852	$323,277	Addtional support for TSCA operations to incinerate waste beyond regulatory requirements, and schedule enhancements for design of the TSCA Upgrade LI
75	WM	LIQUID WASTE OPERATIONS	EW3120041	550	OE	$550	$323,827	Volume reduction of PWTP filter cake
76	ER	OFF-SITE PROGRAM	EW2010	4,410	OE	$4,410	$328,237	Additional funding at Planning Level is for additional work on the Lower East Fork Poplar Creek Total funding at Planning is $14,028
77	ER	Y-12 RPME	EW2010	7,718	OE	$7,718	$335,955	Target & decrement cases are based on latest current working estimates(CWE) Planning is based on approved baseline The baseline for this activity in FY97 is higher than the CWE & is being revised for Scope & Schedule Total funding at Planning is $12,666
78	WM	INDUSTRIAL/SLLW DISPOSAL	35EW31206	279	CE	$279	$336,234	Excavator to support land fill operations
79	ER	GROUNDWATER TREATMENT/RA S&M	EW2010	435	OE	$435	$336,669	Additional Funding at Planning level is for additional Y-12 routine S&M due to a larger program Total funding at planning is $8,538
80	WM	RAD WASTE STORAGE	EW3120060 EW3131090 EW3120041	691 529 1099	OE OE OE	$2,319	$338,988	Funding provides expense support of Dry Cask Storage Line Item Project, for operation of the Y-12 Salvage Yard, and construction of additional pads for IWMF
81	WM	SAFETY DOCUMENT/H&S PROGRAMS	EW3131090	420	OE	$420	$339,408	This task provides additional funding for safety and health activities including those required by DOE orders (SARUP)
82	TRANS	TRANSPORTATION PROGRAM DIRECTION	EW4050	290	OE	$290	$339,698	Additional Funding at the Planning level is for additional Government FTEs to support a larger program
83	ER	9201-4 D&D	EW2010	8,619	OE	$8,619	$348,317	Additional Funding at Planning level is for more extensive D&D work at 9201-4 above the asbestos removal Total funding at planning is $11,194

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84	WM	FFA COMPLIANCE ACTIVITIES - INACTIVE SYSTEMS	EW3120045	520	OE	$520	$348,837	This task provides funding for planning activities in support of FFA tank compliance
85	WM	MIXED/HAZ WASTE TREATMENT/OFF-SITE DISPOSAL	EW3120050	862	OE	$862	$349,699	This activity includes the shipment of mixed waste to Envirocare A 10% productivity savings has been incorporated
86	WM	NDA/NDE OPERATIONS	EW3120060 35EW31206 35EW31203	1377 700 736	OE CE CE	$2,813	$352,512	This task provides for Non-Destruction Assay and Examination (NDA/NDE) of wastes to determine rad content and to ensure proper TSD It also provides for upgrade of existing NDA/NDE equipment
87	WM	POLLUTION PREVENTION	EW3110022	450	OE	$450	$352,962	This activity covers the planning of wastes minimization/pollution prevention activities for all generators No funding is provided for implementation of PP projects for WM facilities
88	ER	Y-12 FFA RA PROJECTS	EW2010	1,686	OE	$1,686	$354,648	Additional Funding at Planning level is for work on the Chestnut Ridge OU-1 RI/FS Total funding at planning is $12,224
89	ER	ORNL OTHER FFA PROJECTS	EW2010	6,378	OE	$6,378	$361,026	Additional Funding at Planning level is for work on the ORNL Groundwater OU, WAG 5 OU and the WAG 6 monitoring & operations Total funding at planning is $11,378
90	WM	WASTE TRACKING SYSTEMS	EW3131090	555	OE	$555	$361,581	This task provides remainder of funding required for activities for the operation and maintenance of systems to collect, validate, and report data associated with waste inventories as required by federal regulations
91	WM	MELTON VALLEY STORAGE FACILITY CAP INC	39EW31309	1,219	LI	$1,219	$362,800	This project provides for additional storage capacity at the MVST facility, primarily in support of ER remedial actions at ORNL
92	WM	TRU WASTE PROGRAM	EW3120043	4,453	OE	$4,453	$367,253	This task covers MVST sludge retrieval and treatment and other TRU activities This funding level represents only a portion of that given in the Site Treatment Plan
93	WM	MIXED WASTE PROGRAM/LDR FFCA	EW3120034 35EW31203	1,821 699	OE CE	$2,520	$369,773	This task provides funding for technology demonstrations to support private sector treatment and outyear compliance with the LDR FFCA

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94	ER	ORNL HIGH PRIORITY D&D	EW2010	2,582	OE	$2,582	$372,355	Additional Funding at Planning level is for work on the Waste Evaporation Facility and additional work on FPPP Total funding at planning is $5,082
95	WM	WASTE CERTIFICATION	EW3120043 EW3120050 EW3120060	162 213 1,148	OE OE OE	$1,523	$373,878	This task covers waste certification and verification activities to ensure proper characterization of wastes by generators This funding level is 50% of that required to ensure proper certification
96	WM	CNF UPGRADE LI PROJECT	EW3130090 39EW31309	200 2,500	OE LI	$2,700	$376,578	This task upgrades the K-25 Central Neutralization Facility
97	WM	SPENT NUCLEAR FUEL PROGRAM	EW3110010	1,200	OE	$1,200	$377,778	This task covers activities for the off-site shipment of Spent Nuclear Fuel from the ORR
98	WM	LLW TREATMENT/OFF-SITE DISPOSAL	EW3120050 EW3120060 EW3131090	1,000 774 613	OE OE OE	$2,387	$380,165	This task includes on-site waste compaction operations and off-site activities - shipments to SEG for compaction / incineration
99	WM	FACILITY CLOSURES	EW3120060	732	OE	$732	$380,897	This task covers a Performance Assessment of sanitary landfills
100	WM	LEGACY WASTE ANALYSIS	EW3131090 EW3120060	854 487	OE OE	$1,341	$382,238	This activity is for the analysis of legacy mixed from Y-12 and K-25 to feed the TSCA Incinerator and is required to meet FFCAct burn plan goals This funding level represents 50% of anticipated need
101	WM	ACTIVE GPP EXPENSE SUPPORT	EW3131090	2,128	OE	$2,128	$384,366	This task provides for WM program management and other support for ongoing GPPs. This funding level provides the remainder of the anticipated need
102	TRANS	OAK RIDGE TRANSPORTATION	EW50	4,401	OE	$4,401	$388,767	Additional Funding at the Planning level would fund additional Transportation Support to DOE HQ
103	ER	K-25 OTHER FFA PROJECTS & ORAU	EW2010	780	OE	$780	$389,547	Funding is included in the Planning level for ORAU Total funding at Planning is $780
104	WM	WM FACILITY UPGRADES	35EW31206 39EW31309	450 5144	CE GPP	$5,594	$395,141	This tasks provides funding for only 6 of 8 GPP and 2 expense projects needed to modify / upgrade existing TSD facilities to meet regulatory requirements

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105	WM	FFA COMPLIANCE ACTIVITIES	EW3120045	680	OE	$680	$395,821	This task covers expense-funded technical support for FFA activities
106	WM	LOW LEVEL WASTE DISPOSAL FACILITY	EW3130090 39E W31309	450 5000	OE 11	$5,450	$401,271	This activity provides for the construction of a disposal facility for Class I,II radioactive waste
107	ER	TECHNICAL SUPPORT	EW2010	104	OE	$104	$401,375	Additional funding at Planning Level is for Remote Sensing Data Analysis & dissemination Total funding at Planning is $510
108	TRANS	OAK RIDGE EMERGENCY MANAGEMENT	EW408080	875	OE	$875	$402,250	Additional funding at Planning Level would fund additional Emergency Management Support to DOE HQ
109	WM	PROCESS WASTE TREATMENT FACILITY	EW3130090 39E W31309	200 5800	OE 11	$6,000	$408,250	This task upgrades the ORNL Process Waste Treatment Facility
110	WM	FUTURE YEAR GPP PLANNING	EW3130090	1,906	OE	$1,906	$410,156	This task provides for planning to support outyear General Plant Projects
111	TRANS	OAK RIDGE ANALYTICAL SERVICES	EW9000	2	OE	$2	$410,158	Additional funding at Planning Level would fund additional Analytical Services to DOE HQ
112	ER	ORNL GUNITE TANKS/S I	EW2010	-4866	OE	($4,866)	$405,292	Target & decrement cases are based on the latest current working estimates(CWE) Planning is based on the approved baseline The WAG 1 Tank Contents Removal isn't in baseline, it's being revised to include this activity Total funding at Planning is $0
113	ER	D&D S&M	EW2010	-653	OE	($653)	$404,639	Funding is lower at Planning due to less routine S&M at ORNL More D&D will have been accomplished at the planning level and less S&M would be required Total Funding at Planning is $6,699
114	ER	ORNL GROUNDWATER/SURFACE WATER	EW2010	-320	OE	($320)	$404,319	The target and decrement cases are based on the latest current working estimates(CWE) The planning level is based on the approved baseline The WAG 4 Seep activity is very low in the baseline versus the CWE, but the WAG 2 Monitoring Program is higher The baseline is being revised to include the proper level for these activities Total funding at Planning is $8,861
		DEFENSE PLANNING FUNDING TOTAL					$404,319	

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1	ER	DOE DIRECT	EX2010	1,674	OE	$1,674	$1,674	DOE Prime contractors program support activities and the ER community relations program
2	EM-60	PROGRAM DIRECTION (DOE)	EX7000000	258	OE	$258	$1,932	DOE direct employees
3	WM	LIQUID WASTE OPERATIONS	35EX31201 EX3120011	180 4,542	CE OE	$4,722	$6,654	Includes the operation, maintenance, & eqpt for treatment of liquid & gaseous wastes Facilities/systems covered are the process & non radioactive liquid waste systems at ORNL
4	ER	PROGRAM MANAGEMENT	EX2010	9,730	OE	$9,730	$16,384	Consists of program management cost associated with MSA-OR
5	WM	FFA COMPLIANCE ACTIVITIES - ACTIVE SYSTEMS	39EX31309 EX3130090	1,106 450	LI OE	$1,556	$17,940	This task provides for the upgrade activities required by the FFA for the active LLLW system at ORNL including integrity testing, contingency planning, and the Bethel Valley FFA line item 15% productivity and M&O savings has been incorporated
6	WM	RCRA/TSCA/MIXED/CLASSIFIED STORAGE	EX3120011	1,058	OE	$1,058	$18,998	This task covers operation, maintenance, and eqpt for the storage of solid and liquid wastes regulated under RCRA and TSCA at ORNL. A 10% productivity savings has been incorporated No funding is included for CONOPS improvements or DNFSB activities
7	WM	WASTE COLLECTION/TRANSPORTATION	EX3120011	1,847	OE	$1,847	$20,845	This task covers the collection/transportation of wastes from the generator to/among TSD facilities at the ORNL. It also covers preparation of wastes for shipment off the ORR A 10% productivity savings is included No CONOPS or DNFSB
8	ER	AGREEMENT IN PRINCIPLE	EX2010	1,108	OE	$1,108	$21,953	Provides funding for the Tennessee, Kentucky, and Ohio Agreements in Principle
9	WM	SAFETY DOCUMENT/H&S PROGRAMS	EX3120011	877	OE	$877	$22,830	This task provides for safety and health activities including those required [illegible] DOE orders (SARUP), activities in response to Price Anderson Amendment Act This level represents 75% of anticipated need
10	ER	ORNL GUNITE TANKS/S I	EX2010	14,834	OE	$14,834	$37,664	Consists of remediation activities with the ORNL WAG 1 North and South Tank Farms, and surface impoundments

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11	EM-60	HI RANKERS S&M	EX7002000	2,169	OE	$2,169	$39,833	Includes periodic surveillance of safety instrumentation, health physic monitoring, instrument calibration, & general maint for 4 (2 reactor fac) high risk-ranking surplus facilities at ORNL & their 27 ancillary support facilities
12	WM	LLLW SYSTEMS LI PROJECTS	EX3130090 39EX31309	600 2,692	LI	$3,292	$43,125	This task provides final year funding for 2 Corrective Activities line items for upgrade of the Bethel Valley and Melton Valley LLLW Collection and Transfer Systems
13	ER	MSRE & HRE	EX2010	6,410	OE	$6,410	$49,535	Consists of D&D activities associated with the Molten Salt Reactor and remediation activities for the Homogenous Reactor Experiment Fuel Wells at ORNL
14	EM-60	HI RANKERS DEACTIVATION	EX7003000	1,572	OE	$1,572	$51,107	Includes activities to assess, characterize, deactivate systems & facilities to reduce ES&H vulnerabilities & to reduce S&M costs while protecting personnel health & safety Included are 2 reactor fac & their 29 ancillary support surplus fac at ORNL
15	ER	ERWM TECHNICAL PROGRAMS	EX2010	1,194	OE	$1,194	$52,301	Several technical and waste management programs such as analytical support, ER waste mgt and T/S/D support, ER groundwater program, off-site shipments contract mgt , records mgt , land use planning, and long term reservation wide monitoring
16	ER	ORNL GROUNDWATER/SURFACE WATER	EX2010	300	OE	$300	$52,601	Includes groundwater and surface water monitoring and remediation activities at ORNL
17	EM-60	IFDP S&M	EX7002000	3,861	OE	$3,861	$56,462	Includes periodic surveillance of safety instrumentation, health physics monitoring, instrument calibration, & general maint essential to safety for 19 (non-reactor nuclear) surplus isotope (glove box & hot cell facilities) facilities at ORNL
18	EM-60	PROGRAM INTEGRATION	EX7001000	1,227	OE	$1,227	$57,689	Includes activities to accomplish pgm planning, identify requirements, & develop programmatic documentation (i e proj requirement docs, proj execution plans, baselines, ADS's) & pgm reporting for Cent EM60, IFDP & HIRanking facilities at ORNL & Y-12

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19	WM	WASTE CERTIFICATION	EX3120011	389	OE	$389	$58,078	This task covers waste certification and verification activities to ensure proper characterization of wastes by generators This funding level is 50% of that required to ensure proper certification
20	EM-60	IFDP DEACTIVATION	EX7003000	2,563	OE	$2,563	$60,641	Includes activities necessary to deactivate facilities to reduce ES&H vulnerabilities, to reduce required S&M tasks & costs, while protecting personnel health & safety Included are 19 contaminated surplus isotope facilities at ORNL
21	ER	TECHNICAL SUPPORT	EX2010	200	OE	$200	$60,841	Consists of technical support activities including risk assessment of groundwater
22	EM-60	ORISE DEACTIVATION	EX7003000	850	OE	$850	$61,691	Includes activities to assess, characterize, deactivate systems & facilities to reduce ES&H vulnerabilities & to reduce S&M costs while protecting personnel health & safety for three non-nuclear contaminated surplus facilities on the OR Reservation
		DECREMENT FUNDING TOTAL					$61,691	
23	WM	WASTE PROGRAM MANAGEMENT	EX3120011	250	OE	$250	$61,941	This task provides for strategic planning for non-defense activities
24	EM-60	PROGRAM DIRECTION (DOE)	EX7000000	46	OE	$46	$61,987	DOE direct employees
25	ER	MSRE & HRE	EX2010	6,256	OE	$6,256	$68,243	Additional funding at the Target Level is for additional work on the Molten Salt Reactor Total funding at Target is $12,666
26	WM	ORNL SANITARY WASTE SYS UPGRADE	39EX31309 EX3130090	1,206 180	LI OE	$1,386	$69,629	This provides the final year of funding for the ORNL Sanitary Sewer System line item
27	EM-60	HI RANKERS DEACTIVATION	EX7003000	661	OE	$661	$70,290	Additional funding at the Target Level is for additional Deactivation to support a larger program Total funding at Target is $2,233
28	EM-60	PROGRAM INTEGRATION	EX7001000	93	OE	$93	$70,383	Additional funding at the Target Level is for additional Program Integration to support a larger program Total funding at Target is $1,989

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29	EM-60	IFDP DEACTIVATION	EX7003000	1,257	OE	$1,257	$71,640	Additional funding at the Target Level is for an increase in the volume of wastes generated and disposed of, and the number (4) of the facilities completely deactivated in the planning year Other activities completed include, development of reduced S&M plans, final facility status reports, and formal reduction of the classification of certain facilities Total Funding at Target is $3,820
30	EM-60	ORISE DEACTIVATION	EX7003000	150	OE	$150	$71,790	Additional funding at the Target Level will allow for the deactivation of all the facilities but all waste resulting from the activities will be disposed of properly This would not facilitate on-site storage, increasing out-year S&M costs
		TARGET FUNDING TOTAL					$71,790	
31	WM	LIQUID WASTE OPERATIONS	EX3120011	712	OE	$712	$72,502	This activity provides for development and demonstration of treatment technologies to support process waste treatment
32	ER	DOE DIRECT	EX2010	293	OE	$293	$72,795	Additional funding at Planning Level is for additional DOE FTEs and support due to a larger Program Total funding at planning is $1,967
33	EM-60	PROGRAM DIRECTION (DOE)	EX7000000	124	OE	$124	$72,919	DOE direct employees
34	ER	PROGRAM MANAGEMENT	EX2010	765	OE	$765	$73,684	Additional funding at Planning Level is for additional Program Support & the ORNL D&D Pgm Mgmt due to their being larger programs at the planning level Additional funding is also included for Community Relations Total funding at planning is $10,495
35	ER	ERWM TECHNICAL PROGRAMS	EX2010	857	OE	$857	$74,541	Additional funding at Planning Level is for additional analytical Support and Waste T/S/D since the program is larger Total funding at planning is $2,051
36	ER	AGREEMENT IN PRINCIPLE	EX2010	221	OE	$221	$74,762	Additional funding at Planning Level is for additional State support T/S/D due to a larger program Total funding at planning is $1,329
37	WM	FUTURE YEAR GPP PLANNING	EX3130090	900	OE	$900	$75,662	This task provides funding for planning of outyear GPPs

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38	ER	ORNL GUNITE TANKS/S I	EX2010	329	OE	$329	$75,991	Additional funding at Planning Level is for additional work on the North and South Tank Farms Total funding at planning is $15,163
39	EM-60	HI RANKERS S&M	EX7002000	217	OE	$217	$76,208	Additional funding at Planning Level is for additional S&M to support a larger program Total funding at planning is $2,456
40	WM	LLLW SYSTEMS LI PROJECTS	EX3130090	75	OE	$75	$76,283	Additional expense support for project management for the Melton Valley LLLW CAT System Upgrade.
41	EM-60	HI RANKERS DEACTIVATION	EX7003000	223	OE	$223	$76,506	Additional funding at Planning Level is for additional Deactivation to support a larger program Total funding at planning is $2,456
42	WM	WASTE CERTIFICATION	EX3120011	389	OE	$389	$76,895	This task provides the remainder of funding for waste certification and verification activities to ensure proper characterization of wastes by generators
43	EM-60	PROGRAM INTEGRATION	EX7001000	36	OE	$36	$76,931	Additional funding at Planning Level is for additional Program Integration to support a larger program Total funding at planning is $2,084
44	EM-60	IFDP DEACTIVATION	EX7003000	838	OE	$838	$77,769	Additional funding at the Planning Level is for assurance of completion of the complete deactivation project in FY 1999 Funding at any other level will prolong the date This level would allow the deactivation of one additional facility in FY97 Total funding at the Planning level is $10,395
45	ER	ORNL GROUNDWATER/SURFACE WATER	EX2010	183	OE	$183	$77,952	Additional funding at Planning Level is for work on the Core Hole 8 and additional work on the WAG 5 Seeps Total funding at planning is $483
46	ER	ORNL OTHER FFA PROJECTS	EX2010	2,250	OE	$2,250	$80,202	Funding at Planning Level is for work on the ORNL Well Pluggin and Abandonment Total funding at planning is $2,250
47	WM	GENERAL PLANT PROJECTS	39EX31309	1,050	GPP	$1,050	$81,252	This activity provides capital funding for TSD facility upgrades

*ER=MSA-OR-1
WM=Waste Mgt.
EM-60= Nuclear Matls Facilities Stabilization

OAK RIDGE OPERATIONS OFFICE
EM NON-DEFENSE INTEGRATED FY1997 PRIORITIZATION
APRIL 17, 1995

INTEG. RANK	PGM*	ACTIVITY	B & R CODE	M $	FT	FY 97 COST ESTIMATE	FY 97 CUMULATIVE	DESCRIPTION
48	ER	ORNL OHF & MISC D&D	EX2010	9,438	DE	$9,438	$90,690	Consists of other ORNL D&D and Remedial Action Projects including metal recovery facility D&D, Old Hydrofracture Facility D&D and WAG 10(OHF) wells remediation
49	ER	TECHNICAL SUPPORT	EX2010	51	OE	$51	$90,741	Additional funding at Planning Level is for Remote Sensing Data Analysis & Dissemination Total funding at planning is $251
50	ER	MSRE & HRE	EX2010	-12,666	OE	($12,666)	$78,075	Target & decrement are based on the latest current working estimates(CWE) Planning level is based on approved baseline The Molten Salt Reactor D&D isn't in the baseline which is being revised to include this activity Total funding at Planning is $0
		PLANNING FUNDING TOTAL					$78,075	

*ER=MSA-OR-1
WM=Waste Mgt
EM-60= Nuclear Mats Facilities Stabilization

OAK RIDGE OPERATIONS OFFICE
FUSRAP AND WSSRAP PRIORITIZATION GROUPS
APRIL 17, 1995

INTEG. RANK	PGM*	ACTIVITY	B & R CODE	M $	FT	FY 97 COST ESTIMATE	FY 97 CUMULATIVE	DESCRIPTION
1	WSS	PROJECT INTEGRATION	EX2010102	23,952	OE	$23,952	$23,952	Includes project management, administration, & implementation support for the WSSRAP in order to place the site in a radiologically/chemically safe condition in accordance with DOE guidelines
2	FUS	BASELINE COMPLIANCE/PGM MGT	EX2020020	11,733	OE	$11,733	$35,685	Requirements necessary to maintain minimum staff to keep FUSRAP a)in compliance with regulations, orders, & FFA commitments, b)in a responsive & reporting mode for Congress, DOE regulatory agencies, & the public, & c)administrative processes operational.
3	FUS	ST LOUIS - SLAPS AND VPs	EX2020020	15,112	OE	$15,112	$50,797	Remediation of the various SLAPS vicinity properties is required to mitigate the spread of contamination on a set of publicly accessible/commercially active properties so that they may be released for unrestricted use The total volume of waste on SLAPS, the residential and commercial vicinity properties is approximately 500,000 cubic yards The allocated budget for FY97 will dictate how much of this contamination can be cleaned up
4	WSS	SUPPORT FACILITY	EX2010102	11,704	OE	$11,704	$62,501	Includes all support services & facilities associated with day to day operation & maintenance of the WSSRAP Also includes grants for stakeholder oversight of the project
5	FUS	ST. LOUIS SLDS AND VP	EX2020020	5,950	OE	$5,950	$68,451	Activities planned for FY97 are the continuation of the decontamination efforts at SLDS, which will focus on unrestricted release of portions of the Mallinckrodt facility
6	WSS	DISPOSAL FACILITY	EX2010102	3,913	OE	$3,913	$72,364	Includes development, construction, & operation of a disposal cell facility, water treatment plant, & waste processing facility for permanent, on-site disposal for all WSSRAP waste. A ROD for treatment & final disposal of this waste was received in 1993
7	FUS	MAYWOOD VPs	EX2020020	8,940	OE	$8,940	$81,304	Work in FY97 will consist of continuing with the remedy implementation for the residential vicinity properties Work will include excavation of contaminated waste and transporting for permanent offsite disposal. Work will continue on performing treatment evaluations for possible use on the waste present on the twenty-four commercial/industrial/governmental properties
8	FUS	COLONIE AND VPs	EX2020020	11,941	OE	$11,941	$93,245	Work for FY97 is to initiate grounds remediation at CISS & 3 contiguous vicinity properties Options include stabilizing the wastes in place, excavation of the wastes & transportation to a commercial disposal facility, or some combination of solutions

*FUS=Formerly Utilized Sites R A Pgm.
WSS=Weldon Spring Site R A Pgm.

OAK RIDGE OPERATIONS OFFICE
FUSRAP AND WSSRAP PRIORITIZATION GROUPS
APRIL 17, 1995

INTEG. RANK	PGM*	ACTIVITY	B & R CODE	M S	FT	FY 97 COST ESTIMATE	FY 97 CUMULATIVE	DESCRIPTION
9	WSS	VICINITY PROPERTIES	EX2010102	242	OE	$242	$93,487	Includes the remediation & restoration of several properties & lakes located outside the DOE property fence A ROD for treatment & final disposal of this waste was received in 1993.
10	WSS	CHEMICAL PLANT	EX2010101 EX2010102	1,055 5,007	OE	$6,062	$99,549	Includes remediation of Chemical Plant buildings, foundations, tanks, soil, & utilities within the DOE property fence A ROD for treatment & final disposal of this waste was received in 1993 Another ROD will be obtained for remediation of groundwater
11	WSS	QUARRY	EX2010101 EX2010102	1,054 2,248	OE	$3,302	$102,851	Includes remediation of 9 acre quarry containing about 126,000 yd3 of rad contam soil & about 3 mil gals of rad/chem contam water ROD for removal of bulk waste recd in '91 Includes obtaining ROD for residual contam & groundwater remediation.
12	FUS	TONAWANDA	EX2020020	5,918	OE	$5,918	$108,769	The scope of work for FY 97 calls for initiating implementation of the final remedy for the Tonawanda site The final remedy is still under development, but will consist of excavation & appropriate disposal of the contaminated soil (either on-site or off-site) or some application of capping in place or treatment to reduce volume.
13	FUS	WAYNE	EX2020020	7,681	OE	$7,681	$116,450	Work in FY97 consists of removal of the interim storage pile for permanent offsite disposal Work will continue on performing treatment evaluations for possible use on the apx 70,000 yd3 of insitu waste on the WISS
14	FUS	MAYWOOD	EX2020020	2,980	OE	$2,980	$119,430	Work in FY97 will consist of continuing the routine environmental monitoring program and completing removal of the interim storage pile for permanent offsite disposal
15	FUS	VENTRON	EX2020020	2,545	OE	$2,545	$121,975	Work will include decontamination of onsite structures, possible removal of contaminated harbor sediment, excavation of contaminated onsite soils, & transportation & permanent offsite disposal of the waste
16	FUS	MISSOURI SITES WORK	EX2020020	10,759	OE	$10,759	$132,734	FY97 work will be funding dependent and will consist of a continuation of remediation activities planned to be performed during FY97 at the St Louis SLAPS site, the St Louis SLDS site, and related vicinity properties
17	WSS	RAFFINATE PITS	EX2010102	8,225	OE	$8,225	$140,959	Includes the remediation of 4 waste lagoons which contain about 408,000 yd3 of raffinate sludge & soil, & about 57 mil. gals of rad/chem contaminated water A ROD for treatment & final disposal of this waste was received in 1993

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OAK RIDGE OPERATIONS OFFICE
FUSRAP AND WSSRAP PRIORITIZATION GROUPS
APRIL 17, 1995

INTEG. RANK	PGM*	ACTIVITY	B & R CODE	M S	FT	FY 97 COST ESTIMATE	FY 97 CUMULATIVE	DESCRIPTION
18	FUS	NEW JERSEY SITES WORK	EX2020020	13,367	OE	$13,367	$154,326	FY97 work will be funding dependent and will consists of a continuation of remediation activities planned to be performed during FY97 at Maywood, Maywood Vicinity Properties, and Wayne sites
19	FUS	NEW YORK SITES WORK	EX2020020	8,477	OE	$8,477	$162,803	FY97 work will be funding dependent and will consist of a continuation of remediation activities planned to be performed during FY97 at the Tonawanda site, the Colonie site, and related Colonie vicinity properties
20	FUS	LUCKEY	EX2020020	4,285	OE	$4,285	$167,088	The scope of work is to characterize the contaminants in the soil, groundwater, & surface water discharges, & to stabilize and remediate consistently with CERCLA criteria & regulator oversight
		DECREMENT FUNDING TOTAL					$167,088	
21	WSS	PROJECT INTEGRATION	EX2010102	97	OE	$97	$167,185	The difference in the Target and Decrement is minimal with the difference being different planning scenarios Total funding at Target is $24,049
22	FUS	MISSOURI SITES WORK	EX2020020	6,322	OE	$6,322	$173,507	Additional funding at Target Level is for additional work on the sites in Missouri Total funding at Target is $17,842.
23	WSS	DISPOSAL FACILITY	EX2010102	924	OE	$924	$174,431	The additional funding at Target is for an acceleration in the construction of the disposal facility Total funding at Target is $4,837
24	WSS	VICINITY PROPERTIES	EX2010102	2	OE	$2	$174,433	The difference in the Target and Decrement is minimal Total funding at Target is $244.
25	WSS	CHEMICAL PLANT	EX2010101 EX2010102	114 920	OE	$1,034	$175,467	The difference in the Target and Decrement is the acceleration of building foundation removal Total funding at Target is $7,096
26	FUS	NEW YORK SITES WORK	EX2020020	4,796	OE	$4,796	$180,263	Additional funding at Target Level is for additional work on the sites in New York Total funding at Target is $17,896.
27	WSS	RAFFINATE PITS	EX2010102	8,843	OE	$8,843	$189,106	The difference in the Target and Decrement is an acceleration of the construction of the full-scale Chemical Stabilization/Solidification Treatment facility by 6 months Total funding at Target is $17,069

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OAK RIDGE OPERATIONS OFFICE
FUSRAP AND WSSRAP PRIORITIZATION GROUPS
APRIL 17, 1995

INTEG. RANK	PGM*	ACTIVITY	B & R CODE	M S	FT	FY 97 COST ESTIMATE	FY 97 CUMULATIVE	DESCRIPTION
28	WSS	SUPPORT FACILITY	EX2010102	-300	OE	($300)	$188,806	The difference in the Target and Decrement is minimal with the difference being different planning scenarios Total funding at Target is $11,404
29	FUS	NEW JERSEY SITES WORK	EX2020020	8,282	OE	$8,282	$197,088	Additional funding at Target Level is for additional work on the sites in New Jersey Total funding at Target is $16,265.
30	WSS	QUARRY	EX2010101 EX2010102	115 -615	OE	($500)	$196,588	The difference in the Target and Decrement is the use of different planning scenarios Total funding at Target is $2,802
		TARGET FUNDING TOTAL					$196,588	
31	WSS	PROJECT INTEGRATION	EX2010102	3,398	OE	$3,398	$199,986	Additional funding at Planning Level will support a two year acceleration of the disposal facility construction and the placement of waste in the disposal facility Total funding at Planning is $27,447
32	WSS	SUPPORT FACILITY	EX2010102	739	OE	$739	$200,725	Additional funding at Planning Level will support a two year acceleration of the disposal facility construction and the placement of waste in the disposal facility Total funding at Planning is $12,143
33	WSS	DISPOSAL FACILITY	EX2010102	12,327	OE	$12,327	$213,052	Additional funding at Planning Level will accelerate construction of the disposal facility and placement of waste in the disposal facility by two years Total funding at Planning is $17,164
34	WSS	VICINITY PROPERTIES	EX2010102	-3	OE	($3)	$213,049	The difference in the Target and Planning is minimal Total funding at Planning is $241
35	WSS	CHEMICAL PLANT	EX2010101 EX2010102	-464 -723	OE	($1,187)	$211,862	The difference in the Target and Planning is the use of different planning scenarios. Total funding at Planning is $5,909
36	WSS	QUARRY	EX2010101 EX2010102	-465 -835	OE	($1,300)	$210,562	The difference in the Target and Planning is the use of different planning scenarios Total funding at Planning is $1,502
37	WSS	RAFFINATE PITS	EX2010102	-121	OE	($121)	$210,441	The difference in the Target and Planning is the use of different planning scenarios Total funding at Planning is $16,947.
		PLANNING FUNDING TOTAL					$210,441	

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WSS=Weldon Spring Site R A Pgm.

OHIO FIELD OFFICE
FY 1997 FINAL BUDGET PRIORITY LIST
MASTER

ADS No.	AO Ranking	OFO Ranking	Priority Category	Activity Description	Program B & R Code	Funding Case	($ In 000s) FY 1997 Budget Estimate
OH-199-18	1	1		Program Direction	EW20	D	22,531
OH-3031-1	1	1		Program Direction	EW31	D	2,961
OH-6100-A	1	1		Program Direction	EW70	D	4,341
OH-4001-WV	1	2	A	WVDP- Vitrification processing of High-Level Radioactive Waste including site safety and regulatory compliance activities. Continue monitoring/detection and containment activities for mitigation of risk to public/environment from radioactive/hazardous waste and contaminant migrations present on site pending a DOE Record of Decision on site remediation.	EX33	D	126,000
OHFN-8-B1	1	3	D	DOE-FN Costs	EW20	D	3,750
OHFN-50-B2	2	4	E	DOE-FN costs for Cincinnati Water Works	EW20	D	50
OHFN-16-C3	3	5	F	DOE-FN costs for Envirocare	EW20	D	100
OHFN-30-B2	4	6	E	Pay invoice for oversight activities in 1995 is expected in Feb. 1996	EW20	D	2,800
OHFN-68-D1	5	7	E	Court settlement, Litigation cost and	EW20	D	3,000
OHFN-68-D1	6	8	A	Occupational Safety & Health	EW20	D	4,124
OHFN-68-D1	7	9	A	Environmental Monitoring	EW20	D	2,340
OHFN-68-D1	8	10	A	ES&H Assurance and Emergency	EW20	D	1,353
OHFN-68-D1	9	11	B	Radiological Controls	EW20	D	6,543
OHFN-68-D1	10	12	B	Safety Analysis	EW20	D	1,053
OHFN-68-D1	11	13	B	Maintenance	EW20	D	4,450
OHFN-68-D1	12	14	C	Porters and Laundry	EW20	D	2,771
OHFN-68-D1	13	15	D	Utilities	EW20	D	4,858
OHFN-68-D1	14	16	F	Training	EW20	D	2,965
OHFN-68-D1	15	17	D	Vehicle Maintenance	EW20	D	700
OHFN-68-D1	16	18	D	Procedures & Internal Audit	EW20	D	225
OHFN-68-D1	17	19	D	RSO Administration	EW20	D	1,672
OHFN-68-D1	18	20	C	Facility and Office Support	EW20	D	6,959
OHFN-68-D1	19	21	C	Security	EW20	D	1,486
OHFN-68-D1	20	22	D	ES&H Administration	EW20	D	538
OHFN-68-D1	21	23	D	Inventory Control and Traffic	EW20	D	1,375
OHFN-68-D1	22	24	D	Preliminary Eng. Startup/Closeout	EW20	D	2,116
OHFN-68-D1	23	25	D	Facilities Services	EW20	D	3,144
OHFN-68-D1	24	26	D	Work Coordination	EW20	D	630
OHFN-8-B1	25	27	D	Office of the President	EW20	D	1,420
OHFN-8-B1	26	28	H	Technology Development	EW20	D	1,228

OHIO FIELD OFFICE
FY 1997 FINAL BUDGET PRIORITY LIST
MASTER

ADS No.	AO Ranking	OFO Ranking	Priority Category	Activity Description	Program B & R Code	Funding Case	($ in 000s) FY 1997 Budget Estimate
OHFN-8-B1	27	29	K	Cleanup Reports, Envoy Program, Visitors Bureau	EW20	D	1,297
OHFN-8-B1	28	30	E	Legal Affairs	EW20	D	1,199
OHFN-8-B1	29	31	D	Quality Assurance	EW20	D	2,571
OHFN-8-B1	30	32	H	Strategic Programs Integration	EW20	D	687
OHFN-8-B1	31	33	D	Project Controls	EW20	D	3,380
OHFN-8-B1	32	34	H	Information Management	EW20	D	5,249
OHFN-8-B1	33	35	D	Acquisitions and Contracts	EW20	D	4,319
OHFN-8-B1	34	36	D	Administration	EW20	D	2,716
OHFN-8-B1	35	37	E	Environmental Compliance	EW20	D	2,361
OHFN-8-B1	36	38	D	Engineering	EW20	D	3,201
OHFN-8-B1	37	39	H	Total Quality Mgmt	EW20	D	567
OHFN-8-B1	38	40	D	Construction	EW20	D	1,539
OHFN-8-B1	39	41	H	Environmental	EW20	D	2,470
OHFN-8-B1	40	42	D	Accounting	EW20	D	1,653
OHFN-8-B1	41	43	D	FERMCO Fee	EW20	D	20,000
OHFN-49-B2	42	44	A	OU4 Facility Ownership Radiological Support	EW20	D	513
OHFN-49-B2	43	45	C	OU4 Facility Ownership General Tasks	EW20	D	428
OHFN-49-B2	44	46	D	OU4 Management	EW20	D	1,789
OHFN-49-B2	45	47	D	OU4 Construction Planning	EW20	D	1,033
OHFN-49-B2	46	48	E	OU4 Compliance Programs	EW20	D	163
OHFN-49-B2	47	49	E	OU4 Treatment Facility Eng.	EW20	D	1,502
OHFN-49-B2	48	50	E	OU4 Facility Equipment	EW20	D	11,796
OHFN-49-B2	49	51	E	OU4 Treatment Facility Construction	EW20	D	15,889
OHFN-49-B2	50	52	E	OU4 Silo Remediation Eng.	EW20	D	596
OHFN-49-B2	51	53	E	OU4 Final Site Remediation	EW20	D	21
OHFN-50-B2	52	54	A	Continue to operate the South Plume well field	EW20	D	330
OHFN-50-B2	53	55	F	Submit RCRA Annual Report to the Ohio EPA	EW20	D	130
OHFN-50-B2	54	56	E	Continue RCRA, DMEPP and South Plume groundwater monitoring	EW20	D	2,400
OHFN-50-B2	55	57	E	Continue to operate site waste waste treatment systems	EW20	D	7,600
OHFN-50-B2	56	58	E	Continue operations (OU5 Removal Actions)	EW20	D	330
OHFN-48-B2	57	59	E	FY 97 Safe Shutdown (Plant 5 and 2/3)	EW20	D	8,003
OHMB-6102B	1	60	A	Maintain Safety Env. of Nucl Facl.	EW70	D	12,049
OHMB-1201	2	61	A	OU 1 Area B Groundwater	EW20	D	2,350
OHMB-6102A	3	62	B	Conduct of Ops.; SSTP	EW70	D	895
OHMB-1170	4	63	B	D&D of SM Building	EW20	D	6,724
OHMB-6102G	5	64	B	General Plant Projects:	EW70	D	2,722

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FY 1997 FINAL BUDGET PRIORITY LIST
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ADS No.	AO Ranking	OFO Ranking	Priority Category	Activity Description	Program B & R Code	Funding Case	($ in 000s) FY 1997 Budget Estimate
OHMB-3100	6	65	C	WM Operations and Maintenance	EW30	D	8,200
OHMB-1210	7	66	D	Program Management CERCLA	EW20	D	9,556
OHMB-4024	8	67	D	Program Management D&D	EW20	D	2,714
OHMB-1204	9	68	E	OU 4 Miami-Erie Canal	EW20	D	2,748
OHMB-1165	10	69	E	D&D of Building 21	EW20	D	1,759
OHMB-6102C	11	70	E	Shutdown Rad Bldgs; process MDUs & special units; minimal integration supt.; extend schedules on energy. bldgs; inert bldgs. shutdown decreased	EW70	D	15,572
OHBC-6201D	1	71	A,B,I,F,K	BCLDP-West Jefferson Site (Battelle)	EW20	D	500
OHBC-6201D	1	71	A,B,I,F,K	BCLDP-West Jefferson Site (Battelle)	EX20	D	3,000
OHBC-6203P	1	71	A,B,I,F,K	BCLDP-West Jefferson Site (Battelle) Project Mgmt.	EX20	D	500
OHRM-7200	1	72	A,B,E,I,F,K	RMI Decommissioning Project	EW20	D	5,986
OHFN-16-C3	58	73	E	Liaison w/ Nevada , Envirocare, TOSCA Incinerator & Permits	EW20	D	500
OHFN-16-C3	59	74	C	Collect and dispose of sanitary waste	EW20	D	200
OHFN-16-C3	60	75	E	Maintain the RCRA operating record and compliance activities	EW20	D	200
OHFN-16-C3	61	76	E	Dispose of approximately 27,000 cubic feet of non-remediation waste	EW20	D	900
OHFN-16-C3	62	77	E	Complete treatment and disposition of approximately 5000 drum of mixed waste	EW20	D	9,000
OHFN-16-C3	63	78	E	Complete Thorium Overpacking operations	EW20	D	555
					TOTAL DECREMENT		409,845
OHFN-16-C3	63	79	E	Complete Thorium Overpacking operations	EW20	T	445
OHFN-48-B2	64	80	E	OU3 RCRA Closure certifications on HWMUs	EW20	T	248
OHFN-48-B2	65	81	E	Sign Final ROD and Responsiveness Summary	EW20	T	250
OHFN-48-B2	66	82	E	OU3 Deliver RD/RA Work Plan Final to U.S. EPA	EW20	T	125
OHFN-16-C3	67	83	E	Continue waste storage activities	EW20	T	500
OHFN-16-C3	68	84	E	Provide oversight and coordination for all FEMP waste mgmt	EW20	T	2,000
OHFN-16-C3	69	85	E	Recycling initiatives: Release approx. 200 tons off process area	EW20	T	700
OHMB-1205	12	86	E	OU 5 South Property	EW20	T	584
OHMB-4028	13	87	E	D&D of EW Soil	EW20	T	3,716
OHMB-1209	14	88	E	OU 9 Sitewide RI/FS	EW20	T	739
OHMB-6102L	15	89	E	Basic capital equip. for infrastructure;	EW70	T	736
OHMB-1172	16	90	I	D&D of SW Cave Areas	EX20	T	1,040
OHMB-1174	17	91	I	D&D of SW and WD Buildings	EW20	T	32
		92		C/PC(Headquarters Directed)		T	223
OHRM-7200	1	93	A,B,E,I,F,K	RMI Decommissioning Project	EW20	T	15,054

OHIO FIELD OFFICE
FY 1997 FINAL BUDGET PRIORITY LIST
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ADS No.	AO Ranking	OFO Ranking	Priority Category	Activity Description	Program B & R Code	Funding Case	($ in 000s) FY 1997 Budget Estimate
OHFN-47-B2	70	94	A	Inspection & Maintenance to Active Flyash Pile	EW20	T	103
OHFN-47-B2	71	95	A	Inspection & Maintenance to Inactive Flyash Pile	EW20	T	28
OHFN-47-B2	72	96	A	Inspection & Maintenance to Seepage Control	EW20	T	51
OHFN-47-B2	73	97	D	OU2 Continue OU Mgmt	EW20	T	1,417
OHFN-47-B2	74	98	E	OU2 Complete Title I/II Design for Disposal Facility	EW20	T	197
OHFN-47-B2	75	99	E	OU2 Complete Test Pad Construction	EW20	T	99
OHFN-47-B2	76	100	E	OU2 Complete Title I/II Design for all Waste Units	EW20	T	314
OHFN-47-B2	77	101	E	OU2Complete RD/RA Work Plans - All Waste Units	EW20	T	214
OHFN-47-B2	78	102	E	OU2 Start Disposal Facility Construction	EW20	T	9,163
OHFN-47-B2	79	103	E	OU2 Initiate Waste Units Construction	EW20	T	894
OHFN-47-B2	80	104	E	OU2 Complete Roads Construction	EW20	T	2,746
OHFN-47-B2	81	105	E	OU2 Start Construction Mgmt for Disposal Facility	EW20	T	260
OHFN-47-B2	82	106	E	OU2 Start Title III and Support Engr during Construction	EW20	T	676
OHFN-47-B2	83	107	E	OU2 Start Construction Mgmt for Waste Units	EW20	T	260
OHFN-47-B2	84	108	E	Start Title III & Support Engr during Construction at Waste Units	EW20	T	451
OHFN-47-B2	85	109	F	OU2 Complete Regulatory Documentation	EW20	T	177
OHFN-47-B2	86	110	F	OU2 Start Sampling & Testing at Disposal Facility	EW20	T	81
OHFN-47-B2	87	111	F	Start Sampling & Testing at the Waste Units	EW20	T	940
OHFN-47-B2	88	112	F	OU2 Start Post Maintenance & Monitoring at the Disposal Facility	EW20	T	355
OHFN-47-B2	89	113	F	OU2 Start Environmental Monitoring	EW20	T	574
OHFN-47-B2	90	114	G	Continue Sitewide Integration Study	EW20	T	761
OHFN-46-B2	91	115	F	OU1 Complete operations planning	EW20	T	744
OHFN-46-B2	92	116	D	OU1 Management/Support	EW20	T	500
OHFN-46-B2	93	117	E	OU1 Complete Treatment Plant Construction/Initiate Facility Startup	EW20	T	5,700
OHFN-46-B2	94	118	F	OU1 Complete ORR/RA & Title III Design	EW20	T	600
OHFN-46-B2	95	119	G	OU1 Award and complete onsite rail upgrade	EW20	T	3,800
OHFN-48-B2	96	120	E	OU3 Project completed and final report to EPA for Plant 4	EW20	T	1,190
OHMB-6102B	18	121	C	Surv. & Maintenance of Excess Facilities	EW70	T	2,127
OHMB-6102A	19	122	D	Planning and Integration	EW70	T	157
OHMB-6102C	20	123	E	Complete safe shutdown baseline activities	EW70	T	3,073
OHMB-6102G	21	124	B	General Plant Projects	EW70	T	771
OHMB-1210	22	125	D	Program Management CERCLA	EW20	T	802
OHMB-4024	23	126	D	Program Management D&D	EW20	T	479
OHMB-1170	24	127	B	D&D of SM Building	EW20	T	1,186
OHMB-1204	25	128	E	OU 4 Miami-Erie Canal	EW20	T	800
OHMB-1165	26	129	E	D&D of Building 21	EW20	T	310

OHIO FIELD OFFICE
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ADS No.	AO Ranking	OFO Ranking	Priority Category	Activity Description	Program B & R Code	Funding Case	($ in 000s) FY 1997 Budget Estimate
OHMB-4028	27	130	E	D&D of EW Soil	EW20	T	655
OHMB-1172	28	131	I	D&D of SW Cave Areas	EX20	T	183
OHMB-1202	29	132	E	OU 2 Main Hill	EW20	T	1;200
OHMB-1174	30	133	I	D&D of SW and WD Buildings	EW20	T	6
OHMB-1170	31	134	I	Ship and bury of SM Soil	EW20	T	1,693
		135		C/PC(Headquarters Directed)		T	39
					TARGET INCREMENT		72,168
					TOTAL TARGET		482,013
OHRM-7200	1	136	A,B,E,I,F,K	RMI Decommissioning Project	EW20	P	2,288
OH-4001-WV	1	137	E	Continue main plant stabilization activities reducing risk to public/environment & avoid cost from failure/repair of aging plant. Achieve early risk reduction to environment/public/site by development of safe storage areas for radio./haz. waste precent on site, including cabability for vit. processing of HCW debris from main plant hot cells within melter design life. Avoid 3161 cost in '98-'99 and loss of technical expertese.	EX33	P	9,000
OHFN-68-D1	97	138	A	Environmental Safety & Health	EW20	P	2,680
OHFN-68-D1	98	139	C	Site Services	EW20	P	5,036
OHFN-68-D1	99	140	D	Support Projects	EW20	P	3,296
OHFN-68-D1	100	141	C	Landlord Management	EW20	P	1,255
OHFN-68-D1	101	142	D	Remediation Project Support	EW20	P	4,579
OHFN-8-B1	102	143	D	Office of the President	EW20	P	140
OHFN-8-B1	103	144	D	Total Quality Management	EW20	P	278
OHFN-8-B1	104	145	K	Public Affairs	EW20	P	745
OHFN-8-B1	105	146	E	Legal Affairs	EW20	P	196
OHFN-8-B1	106	147	D	Quality Assurance	EW20	P	189
OHFN-8-B1	107	148	D	Strategic Program Integration	EW20	P	340
OHFN-8-B1	108	149	D	Project & Information Control	EW20	P	1,086
OHFN-8-B1	109	150	C	Information Management	EW20	P	3,366
OHFN-8-B1	110	151	C	Acquisitions and Contracts	EW20	P	2,117
OHFN-8-B1	111	152	C	Administration	EW20	P	925
OHFN-8-B1	112	153	E	Environmental Compliance	EW20	P	1,183
OHFN-8-B1	113	154	D	Engineering	EW20	P	193
OHFN-8-B1	114	155	G	Construction	EW20	P	896
OHFN-8-B1	115	156	D	Environmental	EW20	P	1,089
OHFN-8-B1	116	157	E	Technology Development	EW20	P	708

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ADS No.	AO Ranking	OFO Ranking	Priority Category	Activity Description	Program B & R Code	Funding Case	($ In 000s) FY 1997 Budget Estimate
OHFN-8-B1	117	158	C	Accounting	EW20	P	208
OHFN-49-B2	118	159	F	Treatment Facility Construction	EW20	P	110
OHFN-50-B2	119	160	H	Complete construction of a new sanitary sewage treatment plant	EW20	P	1,180
OHFN-50-B2	120	161	E	Construction of AWWT Phase III	EW20	P	2,360
OHFN-50-B2	121	162	E	Complete design for all recovery wells to be used for groundwater remediation	EW20	P	1,180
OHFN-50-B2	122	163	E	Continue Soil Verification Sampling Program	EW20	P	2,955
OHFN-50-B2	123	164	E	Initiate excavation in Area 1 for soil remediation	EW20	P	590
OHFN-46-B2	124	165	E	Complete construction of process facilities for Module 1 west pits (Pits 5&6)	EW20	P	2,118
OHFN-46-B2	125	166	E	Commence excavation and processing of Pit 6	EW20	P	3,161
OHFN-46-B2	126	167	E	Complete Engineering Design of dry pit process facilities	EW20	P	4,217
OHFN-46-B2	127	168	E	Start construction of dry pit process facilities Module 2/3	EW20	P	3,750
OHFN-46-B2	128	169	E	Initiate shipment & disposal of process wet pit waste to PCDF and NTS	EW20	P	32,588
OHFN-46-B2	129	170	E	Initiate excavation verification sampling for disposal	EW20	P	3,573
OHFN-46-B2	130	171	E	Waste/Storm Water Treatment	EW20	P	140
OHFN-46-B2	131	172	D	OU1 Management/Support	EW20	P	873
OHFN-48-B2	132	173	E	Accelerate FY 1997 Safe Shutdown Program	EW20	P	2,000
OHFN-48-B2	133	174	D	Above ground D & D area north of 2nd street and above ground D & D area bet	EW20	P	30,027
OHMB-6102B	32	175	C	Surveillance of Excess Facilities	EW70	P	1,067
OHMB-6102L	33	176	E	Basic Capital Equipment	EW70	P	718
OHMB-6102B	34	177	C	SAR Upgrades	EW70	P	469
OHMB-6102C	35	178	G	Baseline plus increased productivity and efficiency	EW70	P	1,000
OHMB-6102G	36	179	B	General Plant Projects	EW70	P	220
OHMB-1170	37	180	B	D&D of SM Building	EW20	P	1,586
OHMB-1204	38	181	E	OU 4 Miami-Erie Canal	EW20	P	4,812
OHMB-4028	39	182	E	D&D of EW Soil	EW20	P	4,579
OHMB-1202	40	183	E	OU 2 Main Hill	EW20	P	3,403
OHMB-1174	41	184	I	D&D of SW and WD Buildings	EW20	P	2,473
OHBC-6201D	1	185	A,B,I,F,K	BCLDP-West Jefferson Site (Battelle)	EW20	D	1,600
OHBC-6201D	1	185	A,B,I,F,K	BCLDP-West Jefferson Site (Battelle)	EX20	D	16,129
OHBC-6203P	1	185	A,B,I,F,K	BCLDP-West Jefferson Site (Battelle) Project Mgmt.	EX20	D	3,271
OHRM-7200	1	186	A,B,E,I,F,K	RMI Decommissioning Project	EW20	P	6,876
OHMB-3100	42	187	C	WM Operations and Maintenance	EW30	P	1,627
OHMB-1175	43	188	E	D&D of Underground Lines	EW20	P	3,425
OHMB-1209	44	189	E	OU 9 Sitewide RI/FS	EW20	P	32
OHMB-3333	45	190	H	D&D of Transitioned Buildings	EW20	P	1,400
OHMB-2222	46	191	H	OEPA CERCLA Reimbursement	EW20	P	1,292

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ADS No.	AO Ranking	OFO Ranking	Priority Category	Activity Description	Program B & R Code	Funding Case	($ in 000s) FY 1997 Budget Estimate
OHMB-1111	47	192	H	AIP for Env. Monitoring Oversight	EW20	P	880
		193		C/PC(Headquarters Directed)		P	0
					PLANNING INCREMENT		189,492
					OFO PLANNING REQUEST		971,505

Richland

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Identifier			Prioritization				FY96	FY 1997			
CP WM ER FT	Program Name	ADS Num.	PPG Score	Grmbly Int.	Workscope Title	Justification / Impacts	Target Case Funded	Decre. Case Funded	Target Case Funded	Planning Case Unfunded	Total Program Require
Cat.								($ in Millions)			
						DECREMENT 1997					
WM	TWRS	1100-0	1693.00	1	OSR Implementation	Justification: Critical Activity associated with Safety Issues with Tank Waste. This work manages safe storage of Tank Waste to ensure public safety Impact: Critical Activities associated with Tank Waste will not be managed.	1 200	0.169	1.000	0.789	1.789
WM	TWRS	1110-0	1693 00	1	Program Management/Regulatory Integration	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed.	10 500	9.775	11 500	0 000	11.500
WM	TWRS	1120-0	1657.00	2	DST Qualification Life Extension (TPA M-32-04)	Justification: Critical Activity associated with Safety Issues with Tank Waste This work identifies a course of action to maintain safe storage of stored waste Impact. Critical Activities associated with Safety Issue resolution will not be managed	1.240	1 335	1.570	0 430	2 000
WM	TWRS	1110-0	1657 00	1	Install Gas Monitors & SHMS's in Flammable Gas Tanks (SI-2h)	Justification. Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	4 013	0.427	0 502	0.000	0 502
WM	TWRS	1110-0	1657.00	1	Monitor Flammable Gas In SY 101/SY-103/AW-101	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0 995	1 131	1 330	0 000	1 330
WM	TWRS	1110-0	1657 00	1	Study Gas Generation Mechanisms for Flammable Gas	Justification Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0 662	0 232	0 273	0 000	0 273

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Identifier			Prioritization				FY96	FY 1997			
CP WM ER FT Cat.	*Program Name*	*ADS Num.*	*PPG Score*	*Grmbly Int.*	Workscope Title	Justification / Impacts	*Target Case Funded*	*Decre. Case Funded*	*Target Case Funded*	*Planning Case Unfunded*	*Total Program Require*
								($ in Millions)			
WM	TWRS	1110-0	1657 00	1	**Evaluate Waste Behavior of Flammable Gas Tanks**	Justification. Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact. Crucial Activity to ensure monitoring of Tank Waste will not be managed	1.117	1.238	1.412	0.000	1.412
WM	TWRS	1110-0	1657 00	1	**Close USQs for Flammable Gas Tanks (SI-2I / M-40-09)**	Justification Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	1.439	1 006	1.183	0.000	1.183
WM	TWRS	1110-0	1657 00	1	**Study Gas Retention Mechanisms for Flammable Gas (PNL)**	Justification Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0.582	0.301	0.354	0.000	0.354
WM	TWRS	1110-0	1657 00	1	**Vapor Space Monitoring for Flammable Gas (M-40-0/SI-2P)**	Justification Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0.864	0.658	0.774	0 000	0.774
WM	TWRS	1130-0	1657 00	1	**Program Technical Integration**	Justification: Critical Activity associated with Safety Issues with Tank Waste This work evaluates Tank Waste to safe storage within the tanks Impact Critical Activity associated with Tank Waste evaluation will not be managed.	1 655	0.910	1.620	0 380	2.000
WM	TWRS	1130-0	1657.00	1	**Safety Resolution DQO Analysis**	Justification: Critical Activity associated with Safety Issues with Tank Waste This work evaluates Tank Waste to safe storage within the tanks Impact Critical Activity associated with Tank Waste evaluation will not be managed	11 961	6.188	8.780	11.619	20.399

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Identifier			Prioritization				FY96	FY 1997			
CP WM ER FT Cat.	Program Name	ADS Num.	PPG Score	Grmbly Int.	Workscope Title	Justification / Impacts	Target Case Funded	Decre. Case Funded	Target Case Funded	Planning Case Unfunded	Total Program Require
								($ in Millions)			
WM	TWRS	1100-0	1657.00	1	**Criticality Engineering**	Justification: Critical Activity associated with Safety Issues with Tank Waste. This work evaluates Tank Waste to safe storage within the tanks Impact Critical Activity associated with Tank Waste evaluation will not be managed.	0.350	0.273	0.273	-0.015	0.258
WM	TWRS	1100-0	1657.00	1	**Safety Documentation Upgrades**	Justification: Critical Activity associated with Safety Issues with Tank Waste This work evaluates Tank Waste to safe storage within the tanks Impact Critical Activity associated with Tank Waste evaluation will not be managed	2.000	0.846	2.000	0.661	2.661
WM	TWRS	1110-0	1657.00	1	**Measure Gas Void/Viscosity/GCS @ AW-101, SY-101, SY-103**	Justification Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	1.874	0.549	0.646	0.000	0.646
WM	TWRS	1110-0	1657.00	1	**Develop Retained Gas Sampler for Flammable Gas**	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0.237	0.122	0.143	0.000	0.143
WM	TWRS	1110-0	1657.00	1	**Study Gas Reaction for Flammable Gas (LANL)**	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed.	0.392	0.081	0.095	0.000	0.095
WM	TWRS	1110-0	1657.00	1	**Perform Waste Behavior Modeling for Flammable Gas**	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	1.468	0.887	1.044	0.000	1.044

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CP WM ER FT Cat.	Program Name	ADS Num.	PPG Score	Grmbly Int.	Workscope Title	Justification / Impacts	Target Case Funded	Decre. Case Funded	Target Case Funded	Planning Case Unfunded	Total Program Require
								($ in Millions)			
WM	TWRS	1130-0	1582 00	1	**Moisture Monitor Engineering for Organics**	Justification: Critical Activity associated with Safety Issues with Tank Waste This work resovles SI with TW containing high energy fuel sources Impact. Critical Activity associated with resolving SI for Tanks with HEFS will not be managed.	0.749	0.601	0.707	-0.707	0.000
WM	TWRS	1110-0	1582 00	1	**Resolve Organic SI/USQ**	Justification: Crucial Activity associated with safe storage of Tank Waste. This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed.	0.645	0.303	0.356	0.000	0.356
WM	TWRS	1130-0	1582 00	1	**Safety Scree DQO Analysis**	Justification: Critical Activity associated w/ Safety Issues (SI) w/ Tank Waste (TW) This work resolves SI with TW containing High Energy Fuel Sources (HEFS) Impact Critical Activity associated w/ resolving SI for Tanks w/ HEFS will not be managed	8.683	5.733	7.470	7.780	15.250
WM	TWRS	1110-0	1582 00	1	**PNL Engineering Services for Mitigation**	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact: Crucial Activity to ensure monitoring of Tank Waste will not be managed.	1.752	2.173	2.557	0.000	2.557
WM	TWRS	1110-0	1582.00	1	**ABU Turnover of Flammable Gas Equipment**	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0.450	0.306	0.380	0.000	0.380
WM	TWRS	1110-0	1582 00	1	**Resolve Safety Issues for Ferrocyanide Tanks**	Justification. Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	1 836	1.286	1.513	0.000	1.513

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Identifier			Prioritization				FY96	FY 1997			
CP WM ER FT	Program Name	ADS Num.	PPG Score	Grmbly Int.	Workscope Title	Justification / Impacts	Target Case Funded	Decre. Case Funded	Target Case Funded	Planning Case Unfunded	Total Program Require
Cat.								($ in Millions)			
WM	TWRS	1110-0	1582 00	1	**Fabricate a Mitigation / Retrieval Pump for SY-101 (Second Spare)**	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	2 000	0 203	0 239	0 000	0 239
WM	TWRS	1110-0	1582 00	1	**Provide Field Support for Flammable Gas Tanks**	Justification. Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	1 867	1.328	1 562	0 000	1.562
WM	TWRS	1110-0	1582 00	1	**Provide Moisture Monitoring for Organic Tanks**	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	7 077	15 224	17 911	0 000	17 911
WM	TWRS	1110-0	1582 00	1	**Resolution of High Heat Tank C-106 SI (M-40-05 / SI-2x)**	Justification Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0 396	0 236	0 278	0 000	0 278
WM	TWRS	1110-0	1582 00	1	**LANL Engineering Services of Mitigation**	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0 278	0 243	0 286	0 000	0.286
WM	TWRS	1120-0	1404 00	2	**W-058 Cross-Site Transfer System (TPA M-43-07)**	Justification Crucial Activity associated with safe storage of Tank Waste This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed	20 704	3 995	4 700	0 000	4 700

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CP WM ER FT Cat.	Program Name	ADS Num.	PPG Score	Grmbly Int.	Workscope Title	Justification / Impacts	Target Case Funded	Decre. Case Funded	Target Case Funded	Planning Case Unfunded	Total Program Require
								($ in Millions)			
WM	TWRS	1120-0	1404.00	2	Field Verify Essential Drawings -- SI 4c42	Justification: Crucial Activity associated with safe storage of Tank Waste This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed.	1.967	0.182	0.271	0.000	0.271
WM	TWRS	1120-0	1404.00	2	TMACS	Justification: Crucial Activity associated with safe storage of Tank Waste. This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed.	5.849	6.037	7.054	2.646	9.700
WM	TWRS	1120-0	1404.00	2	W-314 Restoration and Safe Operations MSA	Justification: Crucial Activity associated with safe storage of Tank Waste This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed	14.975	12.495	14.700	11.000	25.700
WM	TWRS	1120-0	1404.00	2	Engineered Tank Farm Hardware	Justification: Crucial Activity associated with safe storage of Tank Waste. This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed	2.233	1.547	1.820	1.680	3.500
WM	TWRS	1120-0	1404.00	2	W-028 Aging Waste Transfer Line	Justification: Crucial Activity associated with safe storage of Tank Waste. This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed	2.610	1.056	1.243	0.000	1.243
WM	TWRS	1120-0	1404.00	2	Upgrade Operating Procedures for Major Maintenance	Justification: Crucial Activity associated with safe storage of Tank Waste. This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed	0.992	0.910	0.910	0.000	0.910

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CP WM ER FT	Program Name	ADS Num	PPG Score	Grmbly Int.	Workscope Title	Justification / Impacts	Target Case Funded	Decre. Case Funded	Target Case Funded	Planning Case Unfunded	Total Program Require
Cat.								($ in Millions)			
WM	TWRS	1120-0	1404 00	2	**Technical Integration**	Justification: Crucial Activity associated with safe storage of Tank Waste This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed	2 304	1.820	1.820	1.343	3.163
WM	TWRS	1120-0	1404 00	2	**Alarm Panel Upgrades and 701 MCC -- SI 4a34**	Justification: Crucial Activity associated with safe storage of Tank Waste This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed	1 435	1 365	1 521	0 479	2 000
WM	TWRS	1120-0	1404 00	2	**Long Length Contaminated Equip Disposal**	Justification: Crucial Activity associated with safe storage of Tank Waste This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed	3 455	1 820	2 141	1 659	3 800
WM	TWRS	1130-0	1404 00	1	**Operations DQO Analysis**	Justification: Crucial Activity associated with safe storage of Tank Waste This work identifies/characterizes waste to maintain safe storage Impact Crucial activity for waste identifecation will not be managed	1 152	0 910	0 900	0 900	1 800
WM	TWRS	1100-0	1404 00	1	**Rad/Haz Solid Waste Characterization**	Justification Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	2 250	1 692	2 200	0 361	2 561
WM	TWRS	1130-0	1404 00	1	**Supernate Sampling**	Justification. Crucial Activity associated with safe storage of Tank Waste This work identifies/characterizes waste to maintain safe storage Impact Crucial activity for waste identifecation will not be managed	1 329	0 910	1 080	-0 380	0 700

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CP WM ER FT	Program Name	ADS Num.	PPG Score	Grmbly Int.	Workscope Title	Justification / Impacts	Target Case Funded	Decre. Case Funded	Target Case Funded	Planning Case Unfunded	Total Program Require
Cat.								($ in Millions)			
WM	TWRS	1130-0	1404.00	1	Tank Characterization Reports (TCRs)	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact. Crucial Activity to ensure monitoring of Tank Waste will not be managed	2.569	3.185	3.150	2.575	5.725
WM	TWRS	1130-0	1404.00	1	Compatibility DQO Analysis	Justification: Crucial Activity associated with safe storage of Tank Waste This work identifies/characterizes waste to maintain safe storage Impact Crucial activity for waste identifecation will not be managed.	0.709	0.910	0.720	0.380	1.100
WM	TWRS	1130-0	1404.00	1	Field Sampling and Measure Activity Prog Mgmt	Justification: Crucial Activity associated with safe storage of Tank Waste. This work identifies/characterizes waste to maintain safe storage Impact: Crucial activity for waste identifecation will not be managed	1.595	1.456	1.620	-1.020	0.600
WM	TWRS	1100-0	1404.00	1	DST Integrity Assessment	Justification. Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact. Crucial Activity to ensure monitoring of Tank Waste will not be managed.	1.620	0.910	0.910	0.463	1.373
WM	TWRS	1130-0	1404.00	1	Vapor Sampling	Justification: Crucial Activity associated with safe storage of Tank Waste. This work supports the managing of Tank Waste to ensure worker safety Impact: Crucial Activity associated with ensuring worker safety will not be managed	8.860	2.548	3.240	-2.640	0.600
WM	TWRS	1110-0	1404.00	1	Organic Technology Studies	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact: Crucial Activity to ensure monitoring of Tank Waste will not be managed	1.639	0.804	0.946	0.000	0.946

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CP WM ER FT	Program Name	ADS Num.	PPG Score	Grmbly Int.	Workscope Title	Justification / Impacts	Target Case Funded	Decre. Case Funded	Target Case Funded	Planning Case Unfunded	Total Program Require
Cat.								($ in Millions)			
WM	TWRS	1130-0	1404.00	1	**Moisture Monitoring for Ferrocyanide Tanks**	Justfication. Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoriong of Tank Waste will not be manged	1.198	1.193	1.403	-1.403	0.000
WM	TWRS	1100-0	1404.00	1	**East Tank Farm Engineering**	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	2.520	1.095	2.195	1.053	3.248
WM	TWRS	1110-0	1404.00	1	**Organic Studies (PNL)**	Justification. Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	2.227	1.059	1.246	0.000	1.246
WM	TWRS	1100-0	1404.00	1	**SST Stabilization Program Support**	Justification Crucial Activity associated with safe storage of Tank Waste. This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed	3.070	3.045	3.095	-0.178	2.919
WM	TWRS	1130-0	1404.00	1	**Auger Sampling**	Justification: Crucial Activity associated with safe storage of Tank Waste This work identifies/characterizes waste to maintain safe storage Impact Crucial activity for waste identifecation will not be managed	4.696	1.911	1.890	4.935	6.825
WM	TWRS	1100-0	1404.00	1	**242-A, AW/AP Tank Farms, Engineering Analysis**	Justification: Crucial Activity associated with safe storage of Tank Waste. This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed	3.870	2.700	3.200	1.092	4.292

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Cat.								($ in Millions)			
WM	TWRS	1110-0	1404.00	1	Install Temperature Upgrades in Flammable Gas Tanks	Justification. Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	1.073	0.942	1.108	0.000	1.108
WM	TWRS	1130-0	1404.00	1	TWRS Characterization Planning	Justification: Crucial Activity associated with safe storage of Tank Waste This work identifies/characterizes waste to maintain safe storage Impact Crucial activity for waste identifecation will not be managed	1.861	1.092	1.350	2.150	3.500
WM	TWRS	1100-0	1404.00	1	Safety Issue Resolution	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	5.845	4.426	5.623	0.000	5.623
WM	TWRS	1130-0	1404.00	1	Data Definition and Planning	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0.266	0.182	0.180	0.520	0.700
WM	TWRS	1130-0	1404.00	1	Historical Data Development - ICH KH	Justification: Crucial Activity associated with safe storage of Tank Waste. This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed.	1.595	0.455	0.450	1.050	1.500
WM	TWRS	1130-0	1404.00	1	Riser Preparation	Justification: Crucial Activity associated with safe storage of Tank Waste This work identifies/characterizes waste to maintain safe storage Impact Crucial activity for waste identifecation will not be managed	0.443	0.364	0.450	0.050	0.500

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							($ in Millions)				
WM	TWRS	1100-0	1404.00	1	Vadose Zone Monitoring Support (WHC)	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed.	3.000	0.423	0.455	0.735	1.190
WM	TWRS	1130-0	1404.00	1	Core Sampling	Justification. Crucial Activity associated with safe storage of Tank Waste This work identifies/characterizes waste to maintain safe storage Impact Crucial activity for waste identifecation will not be managed	13.024	9.450	10.530	13.995	24.525
WM	TWRS	1130-0	1404.00	1	Data Dissemination	Justification: Crucial Activity associated with safe storage of Tank Waste. This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0.532	0.455	0.450	0.150	0.600
WM	TWRS	1100-0	1404.00	1	CASS/TMACS/SACS Maintenance and Development	Justification. Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	1.200	0.450	1.100	0.016	1.116
WM	TWRS	1130-0	1404.00	1	Data Access Improvements	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0.709	0.637	0.630	0.270	0.900
WM	TWRS	1100-0	1404.00	1	SST Emergency Pumping Preparation	Justification: Crucial Activity associated with safe storage of Tank Waste This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed	2.200	0.600	0.600	0.344	0.944

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Cat.								($ in Millions)			
WM	TWRS	1130-0	1404.00	1	Equipment Replacement	Justification: Crucial Activity associated with safe storage of Tank Waste This work identifies/characterizes waste to maintain safe storage Impact: Crucial activity for waste identifecation will not be managed	0.354	0.364	0.270	3.055	3.325
WM	TWRS	1130-0	1404.00	1	Historical Data Development - LANL	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact: Crucial Activity to ensure monitoring of Tank Waste will not be managed	1.683	0.182	0.180	1.420	1.600
WM	TWRS	1110-0	1404.00	1	Ammonia Upgrades for Safety Basis	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0.576	0.162	0.190	0.000	0.190
WM	TWRS	1130-0	1404.00	1	Field Sampling Readiness	Justification: Crucial Activity associated with safe storage of Tank Waste. This work identifies/characterizes waste to maintain safe storage Impact. Crucial activity for waste identifecation will not be managed	0.089	0.091	0.090	0.010	0.100
WM	TWRS	1130-0	1404.00	1	Data Evaluation and Report Activity Program Management	Justification: Crucial Activity associated with safe storage of Tank Waste. This work monitors Tank Waste to ensure continued operation of safe storage Impact: Crucial Activity to ensure monitoring of Tank Waste will not be managed	0.089	0.091	0.090	0.110	0.200
WM	TWRS	1130-0	1404.00	1	Data Definition Support	Justification: Crucial Activity associated with safe storage of Tank Waste. This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0.709	0.728	0.720	0.155	0.875

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WM	TWRS	1100-0	1404.00	1	SST Interim Stabilization	Justification: Crucial Activity associated with safe storage of Tank Waste This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed	9.360	5.900	5.900	-0.234	5.666
WM	TWRS	1100-0	1404.00	2	242-A, AW/AP Tank Farms, Base Operations	Justification: Crucial Activity associated with safe storage of Tank Waste. This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed	3.060	1.800	2.285	0.805	3.090
WM	TWRS	1100-0	1404.00	2	DST Emergency Pumping Preparations	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0.700	0.273	0.273	-0.115	0.158
WM	TWRS	1100-0	1404.00	2	West Tank Farm, Preventative Maintenance	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	1.380	1.092	1.292	-0.004	1.288
WM	TWRS	1100-0	1404.00	2	East Tank Farm, Corrective Maintenance	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	8.890	7.100	8.300	2.430	10.730
WM	TWRS	1100-0	1404.00	2	East Tank Farm, Facility Operations	Justification. Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	9.004	7.800	8.100	2.287	10.387

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Cat.								($ in Millions)			
WM	TWRS	1100-0	1404.00	2	242-A, AW/AP Tank Farms, Preventative Maintenance	Justification: Crucial Activity associated with safe storage of Tank Waste This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed.	0.630	0.280	0.637	-0.036	0.601
WM	TWRS	1100-0	1404.00	2	Compliance Management	Justification: Critical Activity associated with Safety Issues with Tank Waste This work manages safe storage of Tank Waste to ensure public safety Impact Critical Activities associated with Tank Waste will not be managed.	1.890	1.350	1.400	0.832	2.232
WM	TWRS	1100-0	1404 00	2	East Tank Farm, Preventative Maintenance	Justification. Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed.	1.795	1.395	1.695	-0.064	1.631
WM	TWRS	1100-0	1404 00	2	242-A, AW/AP Tank Farms, Routine Surveillance	Justification: Crucial Activity associated with safe storage of Tank Waste. This work ensures continued operation of safe storage of Tank Waste Impact. Crucial activity for safe storage of Tank Waste wil not be managed	2 300	1 800	2 000	0.146	2.146
WM	TWRS	1100-0	1404.00	2	Permitting and Regulatory Compliance	Justification: Crucial Activity associated with safe storage of Tank Waste. This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed.	1.500	0 750	1.274	1.130	2.404
WM	TWRS	1100-0	1404 00	2	Environmental Engineering	Justification: Crucial Activity associated with safe storage of Tank Waste. This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	4.510	2 700	3.537	1 170	4.707

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								($ in Millions)			
WM	TWRS	1100-0	1404.00	2	**West Tank Farm, Facility Operations**	Justification: Crucial Activity associated with safe storage of Tank Waste. This work monitors Tank Waste to ensure continued operation of safe storage Impact. Crucial Activity to ensure monitoring of Tank Waste will not be managed.	7 447	6.299	6.599	1.899	8.498
WM	TWRS	1100-0	1404.00	2	**West Tank Farm, Routine Surveillance**	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	5.221	4.950	5.050	0.272	5.322
WM	TWRS	1100-0	1404 00	2	**Tank Farm Training**	Justification Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	4 500	3 627	4 262	2 863	7 125
WM	TWRS	1100-0	1404.00	2	**Configuration Management**	Justification: Crucial Activity associated with safe storage of Tank Waste. This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed.	1 500	0 810	1.500	0.217	1.717
WM	TWRS	1100-0	1404 00	2	**Solid Waste Shipping Support**	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed.	7.600	4 700	5 460	1.407	6.867
WM	TWRS	1100-0	1404 00	2	**Industrial Health and Safety Program**	Justification.Crucial Activity associated with safe storage of Tank Waste. This work supports the managing of Tank Waste to ensure worker safety Impact Crucial Activity associated with ensuring worker safety will not be managed	1 000	0 833	0 927	0 446	1.373

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Cat.								($ in Millions)			
WM	TWRS	1100-0	1404 00	2	QA/QC Support	Justification. Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact. Crucial Activity to ensure monitoring of Tank Waste will not be managed	1.300	0 846	1.092	1.054	2.146
WM	TWRS	1100-0	1404 00	2	East Tank Farm, Routine Surveillance	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	6 800	5 973	6 156	0 368	6 524
WM	TWRS	1100-0	1404 00	2	Tank Farm Operations Procedures	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	1.200	0.900	1 183	0.534	1.717
WM	TWRS	1100-0	1404 00	2	242-A, AW/AP Tank Farms, Corrective Maintenance	Justification: Crucial Activity associated with safe storage of Tank Waste This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed	2.380	1 800	2.330	0.846	3.176
WM	TWRS	1100-0	1404 00	2	SST Intrusion Prevention	Justification: Crucial Activity associated with safe storage of Tank Waste This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed	1 250	0.599	0.599	-0 084	0 515
WM	TWRS	1100-0	1404 00	2	West Tank Farm, Corrective Maintenance	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	6.073	5.370	5 870	0 997	6.867

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Cat.								($ in Millions)			
WM	TWRS	1100-0	1404.00	2	**Tank Farm Utilities and Services**	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact. Crucial Activity to ensure monitoring of Tank Waste will not be managed	5.850	5.760	5.760	0.421	6.181
WM	TWRS	1100-0	1404.00	2	**Radiological Protection Support & ALARA**	Justification: Crucial Activity associated with safe storage of Tank Waste This work supports the managing of Tank Waste to ensure worker safety Impact Crucial Activity associated with ensuring worker safety will not be managed	1.390	0.905	1.090	0.198	1.288
WM	TWRS	1100-0	1404.00	3	**West Tank Farm Engineering**	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	2.070	0.902	1.802	1.875	3.677
WM	TWRS	1100-0	1404.00	3	**Planning & Administration**	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed.	1.530	1.080	1.100	0.703	1.803
WM	TWRS	1100-0	1404.00	3	**Program Element and Baseline Management**	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	2.880	1.980	2.000	1.076	3.076
WM	TWRS	1100-0	1404.00	4	**Nuclear Safety Oversite**	Justification. Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact. Crucial Activity to ensure monitoring of Tank Waste will not be managed	0.800	0.207	0.455	0.575	1.030

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								($ in Millions)			
WM	TRP	4190-0	1222.50	2	B PLANT S & M	Provides for safe operations, maintenance, and surveillance of radiological inventory at the B Plant/WESF facilities. If unfunded, non-compliance of multiple DOE orders, OSHA, CRF, and EPA regulations and jeopardize worker safety.	34 400	32.400	33.800	0.200	34.000
WM	TWRS	1200-0	1038.00	3	TWRS SYSTEMS ENGINEERING; Note 2	Implement TWRS System Engineering per DOE Order 4700	9.900	7.338	8.530	3.488	12.018
WM	TWRS	1200-0	1038.00	3	TWRS PROGRAM MGMT; Note 2	Provide management structure, systems, and processes.	6.900	4.328	4.990	2.046	7.036
WM	TWRS	1200-0	1038.00	3	DOE-RL SUPPORT; Note 2	Support RL-TWRS Program.	5 600	3.988	4.590	1.878	6.468
WM	TWRS	1210-4	968 50	1	W-320, 106-C SLUICING	Provide a water sluicing based retrieval system to remove the high heat generating sludge from Tank C-106 to resolve the associated tank safety issue Impact: Unresolved safety issue; missed TPA milestone M-45-03A.	12.733	0.200	0.200	0.000	0.200
WM	TWRS	1210-0	968 50	1	106-C SLUICING OPERATIONS	Provide for operations of the water sluicing based retrieval system to remove the high heat generating sludge from Tank C-106 to resolve the associated tank safety issue Impact Unresolved safety issue, missed TPA milestone M-45-03A	0.000	4.100	4.100	0 000	4.100
WM	TWRS	1210-0	968.50	3	PROGRAM MANAGEMENT	Provide Program Management, integration, baseline planning, budgeting and controls for retrieval technology, engineering, projects, and operations Provides functional and technical requirements for the Program Provides for Program interface, including regulators and stakeholders Impacts None	0 685	1.754	1.754	0.000	1.754
WM	TWRS	1120-0	965 00	2	W-030 AY/AZ Primary Ventilation (TPA M-43-01)	Just: Essential Activity associated with improving WT material conditions for safe storage This work upgrades tank equip to ensure continued integrity of waste storage Impact Essential Activity cont'd integrity of waste storage will not be managed	2 712	0 505	0.594	0.000	0.594

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Cat.								($ in Millions)			
WM	TWRS	1120-0	965 00	2	GPP Definition (Project Management and Systems Engineering)	Just Essential Activity associated with improving WT material conditions for safe storage This work upgrades tank equip to ensure continued integrity of waste storage Impact Essential Activity cont'd integrity of waste storage will not be managed	4 147	3 823	4.557	4 002	8 559
WM	TWRS	1130-0	965 00	1	Analytical Procedures Develop - WHC	Justification Essen Acty assoc. w/ improving WT material conditions for safe storage This work transitions activities to prepare for Retrieval of Waste & reduce costs Impact. Essen Activities for improving WT material conditions will not be managed	0 443	0.455	0 450	0.050	0.500
WM	TWRS	1110-0	965 00	1	Equipment Design/Fab for C-103 Organic layer Removal	Justification: Crucial Activity associated with safe storage of Tank Waste. This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed.	1 213	1.080	1 270	0.000	1.270
FT	TRP	6624	891 00	1	PFP SAS (EM)	This activity provides the safeguard and security resources, direction and oversight for safe, secure and compliant storage of SNM/NM/NF until final disposition of the material is accomplished If unfunded, will create immediate safety problem to plant personnel and the public	1.500	1.600	1 600	0 000	1.600
WM	ROM	7340-0	885 00		HPTs, Environ. Monit/Environ, Surv.	Clean Air Act, 40 CFR 61; Ensure containment of contamination, Air Emissions Report not submitted to EPA	4 645	3.613	4.250	0.794	5.044
WM	TWRS	1200-0	868 00	2	TWRS ESH AND QA	Regulatory requirements - DOE Orders - CFR-10, 29, 49	4 900	3 588	4 120	1 692	5.812
FT	TRP	6624	835 00	2	PFP S & M	Maintain the safety boundary for the PFP (except vaults) and includes all safety boundary maintenance, operation surveillances, and environmental compliance tasks If not funded, will create immediate safety problem to plant personnel and the public	47.300	45.000	48 900	6 200	55.100

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Cat.								($ in Millions)			
FT	TRP	6622	832 00	2	PUREX S & M / COMPLIANCE	Maintain minimum safe surveillance of PUREX. Failure to fund will result in noncompliance with TPA, 10CFR835, 10CFR930 120, related to conduct of operations and maintenance.	34.300	29.000	29.000	0.000	29.000
WM	TWRS	1130-0	829.00	1	Vapor/Auger/Scoop sampling of MUSTs	Justification: Needed activity to manage enhanced safe storage. This work identifies Tank Waste to prepare for Retrieval. Impact Needed Activity to identify Tank Waste to prepare for Retrieval will not be managed.	2.352	1.754	2.064	-1.764	0.300
WM	TWRS	1130-0	829 00	1	In-Situ Methods Development	Justification: Needed Activity to manage enhanced safe storage. This work supports the storage of Tank Waste to enhanced requirement of safe storage Impact: Needed Activity to support storage of Tank Waste to enhanced requirements will not be managed	0.620	0.384	0 630	-0.030	0.600
WM	TWRS	1130-0	829 00	1	Field Sampling Improvements	Justification: Needed Activity to manage enhanced safe storage. This work supports enhanced requirements to ensure safe storage of Tank Waste.Impact Needed Activity to manage enhanced requirements for safe storage will not be managed	0.975	0.728	0 900	5.800	6 700
WM	TWRS	1130-0	829.00	1	Analy Integ Acty Prgm Mgmt	Justification: Needed Activity to manage enhanced safe storage. This work supports enhanced requirements to ensure safe storage of Tank Waste Impact. Needed Activity to manage enhanced requirements for safe storage will not be managed	0.532	0.546	0.540	0.060	0.600
WM	TWRS	1130-0	829 00	1	Hot Cell Instrument Development	Justification: Needed Activity to manage enhanced safe storage This work supports the storage of Tank Waste to enhanced requirement of safe storage Impact Needed Activity to support storage of Tank Waste to enhanced requirements will not be managed	0.443	0.364	0 360	0 440	0 800

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WM	TWRS	1130-0	829.00	1	**PNL Mgmt/QA Support (Program Mgmt and Admin)**	Justification. Needed Activity to manage enhanced safe storage This work supports the storage of Tank Waste to enhanced requirement of safe storage Impact Needed Activity to support storage of Tank Waste to enhanced requirements will not be managed	0.443	0.182	0.180	0.220	0.400
WM	TWRS	1130-0	829.00	1	**Tech Develop and Appl Eng Acty Prog Mgmt**	Justification: Needed Activity to manage enhanced safe storage This work supports the storage of Tank Waste to enhanced requirement of safe storage Impact Needed Activity to support storage of Tank Waste to enhanced requirements will not be managed	1.861	0.927	0.900	0.100	1.000
WM	TWRS	1130-0	829.00	1	**TCAP Improvements (Program Mgmt and Admin)**	Justification: Needed Activity to manage enhanced safe storage This work supports the storage of Tank Waste to enhanced requirement of safe storage Impact Needed Activity to support storage of Tank Waste to enhanced requirements will not be managed	0.266	0.182	0.180	0.020	0.200
FT	TRP	6624	820.50	3	**PRGM MGMT**	Provide programmatic and financial management for TRP to include planning, reporting, oversight, SE and operational assessments If not funded programmatic management for TRP would not occur	3.000	1.900	3.400	0.000	3.400
WM	SW	2320-2	813.50	2	**T Plant Sec Cont/Leak Detect (W-259)**	Provides compliant liquid waste collection, storage, and transfer systems for the 2706-T & 221-T facilities supporting TPA milestone M-32-03 / If not funded, the lack of a compliant liquid waste collection/storage system may result in an unsafe bldg condition	2.334	4.273	4.273	1.277	5.550
WM	ROM	7340-0	790.00		**Groundwater Well Maint. & Decom.**	Provides for groundwater well maintenance and resulting compliance with 40 CFR 265/WAC-173-160	0.000	1.530	1.800	0.000	1.800
WM	PNL	8400 8410	787	1	**CsCl Legacy Safety Program**	Resolve major safety concern in 327 Bldg pool from swelled CsCl capsules If not funded, increased risk of a capsule rupture could contaminate pool and possibly result in loss of 327 facility	1.206	1.001	1.001	0.299	1.300

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CP WM ER FT	Program Name	ADS Num.	PPG Score	Grmbly Int.	Workscope Title	Justification / Impacts	Target Case Funded	Decre. Case Funded	Target Case Funded	Planning Case Unfunded	Total Program Require
Cat.								($ in Millions)			
WM	PNL	8400 8410	781	1	324 Bldg B-Cell Safety Cleanout	Resolve major safety concerns If not funded, would create unacceptable safety risks, and the potential for a release of radioactive material to the environment would increase.	9.806	8.659	8.659	2.585	11.244
WM	ROM	7340-0	780.00		NESHAP Compliance	NESHAP compliance; Noncompliance with EPA-NESHAP Orders	0.787	0.638	0.750	0.308	1.058
WM	TWRS	1240-0	752.50	1	Systems Engineering and Process Requirements	J: Required to develop the HLW Functions and Requirements	0.000	0.907	0.907	0.000	0.907
WM	TWRS	1240-0	752.50	1	Requirements Definition and WFQ	J. Determine the acceptability of proposed waste forms to the repository I. Conceptual design of the facility, TPA milestone M-51-03-T01, will be delayed 3 years if not funded	1.405	0.603	0.603	0.000	0.603
WM	TWRS	1240-0	752.50	3	Program Planning, Integration and Mgt	J: Provide program planning, HLW strategy, budget preparation, schedule, WBS, and change control I: Without this activity the program will not be managed.	1.027	0.901	0.901	0.000	0.901
WM	TWRS	1240-0	752.50	5	HLW Process/Product Dev and Eval	J. Develop, test and evaluate feed process/chemistry and glass formulation alternatives I: TPA milestone M-51-02, select reference melter system, would be delayed 3 years if not funded.	2.628	1.600	1.600	1.800	3.400
WM	TWRS	1240-0	752.50	5	Technology Dev Requirements and Int	J. Identify, integrate, and manage technology development requirements I. If not funded there would not be any HLW technology development Complete melter development, TPA M-51-02, would be delayed 3 years.	0.569	0.750	0.750	0.000	0.750
WM	TWRS	1240-0	752.50	5	HLW Process/Equipment Dev and Eval	J Develop, test and evaluate vitrification system process/equipment options I TPA milestone M-51-02, select reference melter, would be delayed 3 years if not funded	4.720	2.010	2.010	0.000	2.010

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WM	TWRS	1210-3	749.50	1	W-211, INITIAL DST RETRIEVAL	Provide retrieval systems for the first 10 double-shell tanks (DST) to be retrieved This will support resolution of tank safety issues (first designated tank as 101-SY), provide tank waste feed for ultimate disposal, and open tank space to facilitate SST waste transfer (TPA) Impact. Unresolved safety issue, delays to SST retrieval and TPA milestones	13.680	11.200	13.200	8.660	21.860
WM	TWRS	1210-0	749.50	1	SYSTEM DEF - SST	Define and establish the alternate SST retrieval system project engineering trade studies necessary to bound project scope, establish functional requirements, and project documentation necessary to obtain Key Decision 0 Define the tank farm infrastructure requirements necessary to achieve mission and objectives Impact. Delay TPA milestones M-45-03 and 04	4.555	11.616	14.646	3.005	17.651
WM	TWRS	1210-0	749.50	1	SYSTEM DEF - DST	Perform project definition Provide Data Quality Objectives (DQO) for the Retrieval Program in order to characterize the performance of retrieval equipment/processes. Define test program to demonstrate mixer pump performance. Prepare test and evaluation plans. Provide appropriate scale facilities to demonstrate retrieval equipment performance Provide data to develop and/or verify designs of DST waste retrieval projects Impacts Delay DST retrieval project design	0.231	1.707	1.707	0.000	1.707
WM	TWRS	1230-0	749.50	3	ENGINEERING REVIEW/PROG SUPPORT	J-This task will provide planning and reviews of LLW vitrification program documents I-Lack of budget in FY 1996 and FY 1997 will increase risk and acceptance of the program documentation	0.088	0.110	0.110	0.000	0.110

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WM	TWRS	1210-0	749.50	3	SYSTEM ENGINEERING	Provide technical requirements specification, interface control, drawings, design requirements documents, and programmatic trade studies to identify and establish the waste retrieval system Impact: Unresolved safety issue, delays TPA M-45-03, 04, and 07.	0.839	2.517	2.517	0.000	2.517
WM	TWRS	1230-0	749.50	5	DEFINE F AND R	J-Update and revise design requirements documentation, waste feed specifications, and vitrified LLW product criteria to maintian currency with TWRS program and systems engineering developments. I-This activity creates the technical basis for any treatment/disposal actions TPA milestones M-60-03, M-60-04, and M-60-05 will not be met.	0.223	0.080	0.080	0.000	0.080
WM	TWRS	1230-0	749.50	5	DEFINE LLW TECHNICAL BASELINE	J-This task will provide a structure in the collection and organization of LLW technical data to focus the program toward the program mission and provide an assessment of technical/program risks. I-Assessments of program needs and risks will be weakened possibly resulting in faulty decisions which could cause program failure.	0.581	0.700	0.700	0.000	0.700
WM	TWRS	1210-0	749.50	5	TECH DEV/APPL ENG - DST	Identify candidate systems to improve the performance, cost, or operational efficiency over existing mixer pump systems Define, develop, and procure improved mixer pump designs as a cooperative activity with the Savannah River site Provide data to support design of DST Retrieval projects Impacts: No improvements in reliability to current DST baseline system.	0.023	1.878	1.878	0.000	1.878
WM	TWRS	1210-0	749.50	6	CLOSURE	Prepare analysis of federal and state regulations to identify issues relating to closure of SSTs Update SST closure work plan Impact: Delays TPA milestone M-45-06	0.129	0.407	0.407	0.000	0.407

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WM	TWRS	1230-0	749.50	3	OVERSIGHT AND PLANNING	J-Provide management technical direction for all technicaly related activities (melters, simulants, formulation, pilot plant and etc) I-This is an acocunt for the technology group to provide support to the program office. Impacts would be slow down planning, administrative activities, and implementation of technology strategy Impact to TPA M-60-02, M-60-03, M-60-04, M-60-05, and M-60-00	0.213	0.250	0.250	0.000	0.250
WM	TWRS	1230-0	749.50	3	PROGRAM MANAGEMENT	J-Providing the overall management and guidance of the program Preparation and submittal to customer of business plans Support to public involvement, systems engineering and undating LLW Technical Strategy I-Programmatic leadership would be lost and significant impact to all M-60 TPA milestones	1.200	1.280	1.340	0.220	1.560
WM	TWRS	1230-0	749.50	4	DISPOSAL SYSTEMS	J-Technology studies to support disposal systems engineering studies and designs Provide critical input to the Performance Assessment Thsi work is necessary to eliminate the conservatism in the PA and better reflect teh long-term performance of the waste form and disposal system I-Delays to the M 60-05 since a adequate disposal/storage system would be not designed	1.020	1.170	1.170	0.000	1.170
WM	TWRS	1230-0	749.50	5	FORMULATION/MATERIAL CHARACTERIZATION	J-Ensure that vitrified LLW and waste packaging materials are compatible and all LLW PA requiremetns are met Develop glass quaoity requirements I-Delays toTPA milestones M-60-03, M-60-04, M-60-05	1.997	0.900	0.900	0.000	0.900
WM	TWRS	1230-0	749.50	5	PROCESS SYSTEM/NON VITRIFIABLE	J-This activity will evaluate an integrated LLW vitrification facility Primary focus will be that of evalaution of melters, offgas, feed systems, product handling, recycle stystems and etc In addition, this task will generate required information for stabilization, treatment and disposal of non-vitrigfiable products in the mission I-Delays to M-60-03, M60-04, M 60-04, M60-05, and M-60-00	1.577	1.310	1.310	0.000	1.310

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WM	TWRS	1230-0	749 50	5	**MELTER/SIMULANT**	J-Evaluate the abiulity of different melter technologies to vitrify low-level waste. Activity will span FY 1996 and FY 1997 Develop melter technology selectio ncriteria, perform melter testing of multiple technologies with outside vendors and select the optimum melter technology for the vitrification of LLW Definition of LLW vitrification feed specification Develop and procure simulant for melter testing I-Delays to TPA milestones M-60-02 and subsequent milestones and develop new LLW strategy	10 023	0.400	0.400	0.000	0.400
WM	TWRS	1220-0	749.00	4	**HLW Pretreatment Development for Reference Process - Sludge Washing**	J. Supports Completion of TPA Milestone M-50-04-T01, CDR HLW pretreatment facility Concurrent design with CDR LLW pretreatment facility ensures proper and timely integration of requirements I Creates possible disconnect between design of LLW pretreatment and HLW pretreatment (e g both LLW and HLW handling in each facility)	4.300	3 300	3 900	0 000	3.900
WM	TWRS	1220-0	749 00	4	**LLW Pretreatment Development For Reference Process - CST**	J. Needed to support Definitive Design for LLW Pretreatment facility I Potentially delays LLW processing	0 400	1.700	2.080	0 000	2.080
WM	TWRS	1220-0	749 00	4	**Develop Flowsheets - Retrieval Blending & Flowsheets**	J Needed to support effort to determine whether advanced sludge seperation processes are required, M-50-03 I. Jeopardizes completion of TPA Milestone M-50-03 and delays or creates great uncertainty for the LLW/HLW pretreatment plants and possibly LLW/HLW Vitrification plants	2.600	2.200	2.600	0.000	2.600
WM	TWRS	1220-0	749 00	4	**LLW Pretreatment Development For Enhancements and Alternatives - Other Radionuclide Removal**	J Needed to support waste treatment prior to processing in either HLW or LLW facilities I Potentially delays LLW processing	2.300	1.272	1 427	0.040	1 467
WM	TWRS	1200-0	725 50	1	ENVIR IMPACT STATEMENT	Regulatory requirements - TPA, NEPA, CFR-10, 40, 42	3 800	1 278	1.400	0 567	1.967
WM	TWRS	1200-0	725 50	5	PNL TDPO & PROGRAM MGMT	Coordinate TWRS Integrated Technology Planning activities	5 400	3 958	4.550	1.873	6.423

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ER	ERC	3600	687.00	1	- N Basin cleanout	Reduce environmental risk, reduce future S&M costs; meet TPA	4.648	3.673	4.937	1.772	6.709
ER	ERC	3600	687.00	4	N-Reactor Building/System Deactivation	Reduce environmental risk, reduce future S&M costs, meet TPA	4.949	3.911	5.259	3.819	9.078
ER	ERC	3125	687.00	4	100-NR-1 Assessment	Reduce worker risk, meet TPA	3.510	1.105	1.300	1.982	3.282
ER	ERC	3600	687.00	4	N-Reactor Facility Compliance	Reduce environmental risk, comply with state and federal regulations	11.003	11.116	11.804	1.917	13.721
WM	SNFP	4110	646.00		K BASINS OPERATIONS	Necessary for operation of the K Basins and facility support projects This includes K Basin operations, surveillance, preventive and corrective maintenance, and waste handling Installation of seismic barrier doors and degrading roof repairs are included in K Basin activities. Funding is required to maintain storage of the spent nuclear fuel at the K Basins	35.700	34.200	34.200	0.000	34.200
WM	SW	2220-1	627.00	2	WRAP 1 Construction (W-026)	Complete construction activities in 3/96, and perform activities in support of a 3/97 startup	6.200	3.300	3.300	1.681	4.981
WM	SW	2220-1	627.00	2	WRAP 1 Start-Up/Operations (W-026)	Provides the required support to commence WRAP 1 operations on or before 3/31/97, to meet M/S M-18-00; provides operations and maintenance of the WRAP 1 facility / Failure to fund requires renegotiation of TPA M/S M-18-00.	5.075	6.600	8.200	4.283	12.483
WM	TWRS	1230-0	625.50	2	COMPLIANCE	J-This activity will provide preliminary safety evaluation and regulatory support to the LLW program leading to detailed safety and regulatory analysis by the AE/CM. I-TPA milestones M-60-03, M-60-04, M-60-05, M-60-00.	0.380	0.070	0.070	0.000	0.070
WM	TWRS	1230-0	625.50	3	TECHNICAL BASIS DOCUMENT MAINTENANCE	J-This activity will provide a system to handle and control LLW Program and Project documentation I-Program can expect to expend far greater resources to retrofit a document handling systems to support faciltiy ORR and conduct of operations needs	0.305	0.440	0.440	0.000	0.440

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WM	TWRS	1230-0	625 50	6	PROD QUALITY/MISC TECH/DATABASE	J-This activity will provide non-destructive methods of monitoring the waste form to provide assurance of stability. Miscellaneous technology studies activity will provide evaluation of technologies that are currrently identified which may be identified through testing Collect technical information I-Performance of vitrified product in the disposal environment will not be able to be monitored without exposure	0.525	0 570	0.570	0 000	0.570
WM	TWRS	1230-0	625.50	1	PREPARE LLW PA	J-This task will prepare an interim Performance Assessment to provide confidence before start of construction that the low-level waste disposal will pass DOE and public review Following the interim PA, a preliminary and final PA will be completed for review and approval by DOE-HQ supporting the start of construction of disposal facilities I-Lack of funding of the PA will increase the risk to acceptance of the final disposal system, delay construction of disposal facilities and M-60-05	3.681	2 590	5.710	0.000	5.710
WM	TWRS	1230-0	625.50	3	PROJECT MANAGEMENT	J-Project Management activities are requred to manage the project This consists of change control admin, baseline management, program plan development, configuratino control, cost rep[orting, rpocedure preparation, personnel management, reports/presentations, and quality assurance oversight. I-TPA milestone M60-03,M-60-04, M-60-05 and possibly M-60-00	2.334	0.900	2.240	0.144	2.384
WM	TWRS	1230-0	625 50	4	DESIGN	J-Conceptual design activitie sinclude development of a conceptual design report including the cost and schedule information required for KD 1 and 2. I-TPA Milestones M-60-03, M-60-04, M-60-05 will not be met	13.084	2.000	2.000	19 680	21.680
WM	TWRS	1230-0	625 50	6	SAFETY DOCUMENTATION	J-Safety analysis reprot/permitting activites will provide documentation addressing significant safety aspects of the project and environmental documentation addressing construction and operation	1 169	0.730	0.730	0 912	1.642

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FT	Landlord	6670	614.00	2	**CE--Fire & Med Serv/Lab Equipmt**	FY 96. Computer Aided Dispatch Vehicle Computers for enhanced fire safety and improved response FY 97: Mobile Decontamination Unit and replacement Heart Monitor Defibrillators for enhanced worker safety	1.077	0.582	0.747	0.227	0.974
WM	SW	2320-0	613.50	2	**SNF&Contam Equip Storage**	Provides maintenance and operations support for Spent Nuclear fuel elements and contaminated equipment in the 221-T canyon /If not funded, puts at risk the ability to maintain the facility in a safe condition	12.400	12.600	12.600	12.575	25.175
WM	TWRS	1280-2	610.50	4	**IPM**	**J: Pretreat supernates in all 177 waste tanks and provide low and high level waste fractions in support of planned vitrification facilities. I: Delays all LLW Pretreatment facility Milestones, M-50-02.**	24.300	12.750	15.000	30.332	45.332
WM	ROM	7340-0	610.00		**Groundwater Sampl.; Analy. & Purge**	Samples are collected and analyzed in support of RCRA, SDWA, CWA, and 40 CFR 265 requirements, noncompliance will put groundwater and public at risk	6.108	4.484	5.275	1.510	6.786
WM	PNL	8400 8410	609.5	2	**Surveillance & Maintenance (324, 325, 327, 242B/BL, 2718E)**	Regulatory requirement for regular inspection of safety systems and safe storage of radioactive materials. If not funded, significant worker safety issues and the potential for release of radioactive materials to the environment would increase	5.478	5.237	5.237	1.563	6.800
WM	TWRS	1110-0	606.00	1	**Install/Operate Removal Equipment for C-103 Organic Layer**	Justification. Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	1.611	1.465	1.724	0.000	1.724
WM	PNL	8400	601.5	2	**Public Safety & Resource Protection Program**	Independent assessment of the impacts of Hanford on the environment and public Monitors air, vegetation, wildlife, Columbia River, etc If not funded, eliminates annual Hanford Site Environmental Report used by RL, contractors, public as baseline info	7.119	5.315	6.293	6.139	12.432
FT	Landlord	6665	587.50	2	**Demolition**	FY 96 and 97. Removes worker and public hazards, reduce maintenance load and contributes to cleanup	2.000	2.400	3.500	0.000	3.500
ER	ERC	3510	580.00	1	**100 Area Facility D&D**	Reduce worker risk, comply with state & federal reg's	8.945	9.550	12.400	5.368	17.768

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ER	ERC	3510	580.00	1	100 Area Common Activities Assessment	Reduce worker risk, comply with state & federal reg's.	6.355	6.600	6.600	4.500	11.100
ER	ERC	3010	567.00	1	RARA Common Activities - Remediation	Reduce worker risk, prevent further damage	5.200	3.825	4.500	1.440	5.940
ER	ERC	3500	567.00	1	Asbestos Abatement Common - Remediation	Reduce worker risk, comply with state & federal reg's.	1.800	1.275	1.500	0.000	1.500
ER	ERC	3800	567.00	4	Long Term S&M	Meet TPA & comply with other state & federal regulations	0.200	0.170	0.200	0.030	0.230
FT	Landlord	6665	551.50	2	Roofs/HVAC	FY 96 and 97. Eliminates imminent hazards to workers and maintains safe facilities.	2.000	1.800	1.900	1.100	3.000
FT	Landlord	6665	551.50	2	GPF Repair & Minor Upgrades	FY 96 and 97: Fixes safety hazards, roof and HVAC problems that could lead to larger replacement costs, and keep key facilities operable. Part of overhead to direct funding transition	1.400	1.400	1.400	0.000	1.400
WM	Liquids	2300-0	507.50	4	300 A LE Facilities Operations	Provides compliant operations of 300 Area TEDF, 340 Facility and 307 Basins IMPACT Failure to operate would cause closure of 300 Area facilities, including labs and delay TWRS TPA milestones associated with core sampling analysis and tank safety investigations	11.375	11.139	11.139	0.905	12.044
WM	SNFP	4110	492.00		ESSENTIAL SYSTEMS RECOVERY	Necessary to repair or replace minimal infrastructure systems at 100K to meet DOE objectives associated with fuel removal This project consists of water supply, electrical system, fire protection, and maintenance support infrastructure elements If not funded increased employee risk and degraded infrastructure systems will exist	8.700	0.800	0.800	0.000	0.800
FT	Landlord	6670	486.50	2	CE--Utilities(WaterSewerSteamElec)	FY 96 and 97 Funds to procure equipment which will enable transition of services currently provided inhouse.	2.443	1.362	1.726	0.389	2.115
ER	ERC	3410	483.00	3	RL Support to ERC	Required by DOE policy & regulations; establish managerial & Financial control systems & provide for safe operations, project oversight & control	23.300	10.720	12.300	3.730	16.030
ER	ERC	3400	483.00	3	Project Services Program Management, QESH	Required by DOE policy & regulations; establish managerial & Financial control systems & provide for safe operations, project oversight & control	12.267	4.913	5.966	0.000	5.966

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ER	ERC	3400	483.00	3	Project Technical Services	Environmental science & engineering support for adequate management of risks & threats site-wide	10.855	4.550	5.256	1.026	6.282
FT	Landlord	6670	471.50	2	CE--Business Equipmt (ADP/Comm Sys)	Hanford Emergency Alarm Dispatch System (96) necessary to implement single point of contract for Emergency 911. Area Emergency Sirens (96) needed to enhance worker and public emergency notification. Spatial Data Information Management, Phase II (96) and III (97) Tri-Party Agreement data management milestones Automated Mapping and Facilities Management System (97) required for electrical system data management	3.804	1.056	1.714	5.897	7.611
WM	SW	2320-0	466.00	4	Contam Equip Processing	Provides cost effective decontamination and treatment for equipment or material with high radiation /Negates the purchase of costly equipment replacement	4.100	0.500	3.600	12.431	16.031
FT	Landlord	6675	462.00	2	General Plant Projects (GPPs)	FY 96: Complete construction of the 400 Area Sanitary Waste Lagoon to comply with State law in eliminating unregulated waste discharge to the ground. FY 97: Sanitary waste disposal contract with the City of Richland requires elimination of non-contact cooling water from the sewer. Current systems have high potential of failure and need replacement to support building mission (spent fuels). Correct urgent problems, as they arise.	3.000	2.500	3.000	6.500	9.500
FT	Landlord	6680	462.00	2	GPP ID & Scoping	FY 96 and 97: Includes updating baselines for ongoing projects, maintaining baselines for proposed projects, evaluating cost effective alternatives to resolve infrastructure problems, developing baselines for infrastructure transition and Project Management for small projects. Provide NEPA documentation for General Plant Projects and Small Projects per 40 CFR, 1500-1508, 10 CFR part 1021, and WAC 187-11	0.200	0.200	0.200	0.200	0.400

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WM	SW	2200-0	445.00	3	DOE Program Support	Prepare and deliver to WHC, RL, HQ, and the public, DOE-mandated support for the ADS document, MYPP, SMS/PTS/TPA reports, and data calls / Failure to fund leaves Hanford without programmatic support to Solid Waste Management facilities.	4.994	4.410	4.965	0.892	5.857
WM	PNL	8400	439	2	Waste Mgmt Operations	Regulatory requirement to manage PNL hazardous and radioactive wastes. If not funded, fines may result for violations of numerous environmental and safety regulations.	3.126	2.910	2.910	0.869	3.779
FT	Landlord	6680-13	419.50	2	L-116, 200 Area Sanitary Sewer	FY 96 and 97: Begin definitive design (FY 96) and start construction (FY 97) on a 200 Area sanitary sewer system to replace existing failing 1940 vintage drainfields. These have failed and are being pumped at a cost of $360K per year. Drainfields will continue to fail and existing systems are at capacity. Will continue to pump and install emergency drainfields. Cost to other programs and overhead.	1.871	4.055	4.055	0.000	4.055
WM	SW	2200-0	408.50	2	TRU Storage	Provides RCRA compliant storage of transuranic waste /Failure to fund leaves the Hanford Site with noncompliant and potentially unsafe Solid Waste Management of transuranic waste	3.957	3.695	3.695	3.231	6.926
WM	ROM	7340-0	406.00		Report Data; Proj. Scient.; Admin.	RCRA, WAC, and 40 CFR 265 require data management of groundwater data; lack of complete records; loss of	2.046	1.428	1.678	0.523	2.201
WM	SW	2200-0	398.00	2	LLBG ES & H	Provides for the maintenance and upkeep of the low level radioactive waste burial grounds for onsite and offsite generators /Failure to fund leaves the Hanford Site and offsite generators unable to dispose of low level waste	6.268	6.405	7.005	2.153	9.158
WM	PNL	8400	387	1	RMW Storage Tank Inspection (PNL)	Regulatory compliance for inspection of highly radioactive storage tanks. If not funded, tank integrity cannot be demonstrated, leaks may not be stopped, and the potential for release of radioactive material to the environment may increase.	1.266	1.127	1.127	0.337	1.464

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CP WM ER FT	Program Name	ADS Num.	PPG Score	Grmbly Int.	Workscope Title	Justification / Impacts	Target Case Funded	Decre. Case Funded	Target Case Funded	Planning Case Unfunded	Total Program Require
Cat.								($ in Millions)			
ER	ERC	3520	386.00	1	D&D 200-ZP-1 (232-Z Bldg.)	Reduce worker risk, comply with state & federal reg's.	0.600	0.600	0.600	0.000	0.600
ER	ERC	3520	386.00	1	200 Area S&M	Reduce worker risk, comply with state & federal reg's.	6.628	2.693	3.443	0.800	4.243
ER	ERC	3520	386.00	1	D&D 200-RO-3 (233-S Bldg.)	Reduce worker risk, comply with state & federal reg's.	0.972	0.957	0.957	0.000	0.957
WM	PNL	8400	384	2	Effluent Monitoring	Regulatory requirement for monitoring PNL air and liquid effluent streams to verify compliance. If not funded, fines may result for violations of environmental laws and facilities may be forced into shutdown	3.605	0.032	3.321	0.991	4.312
FT	Landlord	6680-4	382.00	2	L-070, 300A Pro Sew Pip Sys Upg	FY 96 and 97: Replaces 1930-1940 vintage leaking clay process sewer piping to ensure compliance with TPA-M17-06J, K, "Cease Discharge to the Soil Column."	1.395	0.225	0.225	0.000	0.225
WM	PNL	8400	378	2	NEPA Compliance Program	Regulatory requirements to assess environmental compliance of PNL programs. If not funded, law suits may result and facilities/programs may be shut down.	0.469	0.430	0.430	0.128	0.558
WM	SW	2200-0	376.00	2	RMW /CWC Storage	Provides for RCRA and TSCA compliant storage of radioactive mixed waste /Failure to fund leaves the Hanford Site with noncompliant and potentially unsafe Solid Waste Management of radioactive mixed waste.	6.263	5.977	5.977	1.494	7.471
ER	ERC	3110	374.00	4	100-KR-4 Assessment	Reduce worker risk, meet TPA	0.200	0.170	0.200	1.086	1.286
ER	ERC	3700	374.00	4	ERDF: Technical Support and Engineering	Meet TPA	2.722	2.500	2.500	0.000	2.500
ER	ERC	3120	374.00	4	100-HR-1 Remediation	Reduce worker risk, meet TPA	2.850	2.951	2.951	0.000	2.951
ER	ERC	3105	374.00	4	100-BC-1 Remediation	Reduce worker risk, meet TPA	9.476	4.951	6.271	36.795	43.066
ER	ERC	3120	374.00	4	100-HR-3 Remediation	Reduce worker risk, meet TPA; HR-3 pump & treat not support, delaying TPA M-16-12E	1.900	1.054	1.054	4.081	5.135
ER	ERC	3105	374.00	4	100-BC-5 Assessment	Reduce worker risk, meet TPA	1.523	0.798	0.798	0.349	1.147
ER	ERC	3120	374.00	4	100-HR-2 Remediation	Reduce worker risk, meet TPA	0.950	0.245	0.245	0.000	0.245
ER	ERC	3105	374.00	4	100-BC-2 Remediation	Reduce worker risk, meet TPA	0.000	1.731	1.731	0.757	2.488
ER	ERC	3700	374.00	4	ERDF: Facilities Design and Construction	TPA / Protect river (support remediation of 100 area OU's), meet TPA, Complete construction by 9/30/96	15.632	8.635	10.600	1.138	11.738
ER	ERC	3100	374.00	4	100-DR-2 Assessment	Reduce worker risk, meet TPA	0.144	2.975	3.500	0.643	4.143
ER	ERC	3115	374.00	4	100-FR-3 Assessment	Reduce worker risk, meet TPA	0.200	0.255	0.300	1.123	1.423

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Cat.								($ in Millions)			
WM	PNL	8400 8410	368.5	2	**PNL EM RCRA Compliance (324 Bldg REC, HLV Tank Closure, Permitting)**	Regulatory requirements for compliance with RCRA and for permitting basic research in the treatment of RCRA hazardous wastes If not funded, would result in failure to meet TPA milestones, potential fines for RCRA violations, and shutdown of operations	0.000	0.085	0.085	0.025	0.110
FT	TRP	6623	365.00	2	**300 AREA Environmental Compliance**	Activities to comply wiht federal, state, and environmental regulations and doe Orders If not funded, risk substantial fines and hazards	1.800	2.000	2.000	0.000	2.000
FT	Landlord	6680-11	363.50	2	**D-424, 324 Fac Comp Renovation**	FY 96 and 97: Brings building electrical and mechanical systems into compliance with current standard industrial codes and regulations Ensures worker safety and facility reliability in support of Tri-Party Agreement activity	3.538	0.879	0.879	0.000	0.879
WM	Liquids	2300-0	358.50	4	**200 A ETF Operations**	Provides compliant operations of LERF, 200 Area ETF, and 200 Area TEDF IMPACT TPA M-26 milestones are missed and 242-A Evaporator is shutdown which impacts numerous TWRS milestones, available double-shell tank space Failure to operate the ETF will cause the LERF to exceed its limitations for storage of LDR waste	20.067	11.008	15.363	4.937	20.300
FT	Landlord	6660	351.50	4	**Site Planning**	FY 96 and 97 Ensures Hanford Site Infrastructure is adequately managed	1.634	1.634	1.634	7.081	8.715
WM	SW	2320-0	348.00	4	**Wst Verif,Repack,&Decon**	Provides low level decontamination of equipment at the 2706-T Facility /Eliminates the need of a costly spare parts inventory while negating additional costs for final disposal of the equipment	5.500	5.000	5.500	3.450	8.950
WM	SW	2320-0	345.00	2	**LWTC Maint/Cert & Disposal**	Provides maintenance, inspection, repairs, testing, and certification to insure availability of at least one tank car /Puts at risk the ability for the Hanford site to transfer Dangerous Mixed Liquid Wastes to compliant storage	0.500	0.500	0.500	0.122	0.622
FT	Landlord	6660	344.00	3	**Program Management**	FY 96 and 97 Multi-Year Program Plan, Activity Data Sheets, performance reporting and activity managment for the program	1.752	0.938	0.938	1.123	2.061
ER	ERC	3300	344.00	4	300-FF-2 Assessment	Reduce worker risk, meet TPA	2.925	0.294	0.294	0.000	0.294

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								($ in Millions)			
ER	ERC	3300	344.00	4	300-FF-2 Remediation	Reduce worker risk, meet TPA; target case limits remedial design & actions	0.000	0.277	0.277	0.000	0.277
ER	ERC	3300	344.00	4	300-FF-1 Remediation	Reduce worker risk, meet TPA; target case limits remedial design & actions	2.875	3.679	4.429	0.216	4.645
WM	SW	2200-0	338.50	5	Sys Engineer & Analysis	Provides for the development of the Solid Waste (SW) Technical Baseline document, Hanford WAC, SW Information and Tracking Systems (SWITS) and Interface Control Documents / Failure to fund leaves Hanford without a waste acceptance and tracking system potentially curtailing waste storage/disposal operations.	4.000	1.300	3.300	1.926	5.226
FT	TRP	6624 6625	326.50	1	PFP INTERIM ACTIONS/94-1	Deactivate nonessential systems, system components, and minimize environmental, public, and personnel hazards at PFP If not funded, will not be able to reduce plant costs and risks to personnel and the public.	17.400	6.400	14.300	20.100	34.400
WM	Liquids	2300-0	322.40	3	Program Management	Provides planning, budgeting, statusing, performance monitoring, customer interface, award fee, and program direction IMPACTS TPA M-17 and Consent Order DE-91NM-177 milestones missed and TPA Article XLVIII, Para 148/149 Cost, Schedule, and scope planning and reporting not supported	2.500	2.400	2.459	0.003	2.462
FT	TRP	6622	315.50	1	PUREX DEACTIVATION	Deactivate PUREX to reduce S&M costs to a minimal level Failure to fund will result in noncompliance with theTPA and WAC 173-303 and PUREX surveillance and maintenance costs would remain approximately $35M per year	14.200	9.000	9.000	0.000	9.000

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Cat.								($ in Millions)			
WM	WMin	7332	315.00	4	**Site Waste Minimization Program Integration, Reporting, and Implementation**	Develop & implement site WMin/P2 program. Prepare environmental reports required by 40 CFR 265 and WAC 173-307. The following requirements will not be met at FY96 target funding: RCRA Sect 6002 & EO 12873 affirmative procurement, EO 12843 ozone depleting substance reduction, EO 12856 reduction of EPCRA 313 reportable hazardous chemicals, & DOE 5400 1. Criminal and civil penalties may result for non-compliance. Requirements will be met at FY97 target funding.	0.566	1.000	1.220	0.000	1.220
WM	TWRS	1210-0	306.00	1	**LEAK DETECTION**	Provide leak detection and monitoring system functions and requirements, evaluate the available technologies, and select technologies for engineering development and testing. Test the selected technologies. Provide the leak detection and monitoring system. Impact: Potential delay to start of sluicing activities and TPA milestone M-45-04.	0.601	2.191	2.191	0.000	2.191
WM	TWRS	1230-0	306.00	1	**GROUT FACILITIES**	J-Compliance with TPA milestones to maintain facilities in standby. I-The withdrawal fo budget for grout facilities would violate stated and federal requirements for a operational facility.	0.155	0.100	0.100	0.300	0.400
WM	TWRS	1240-0	306.00	1	**Safety Analysis/Permitting**	J Provide the safety and environmental permitting analysis and documentation needed to establish the HLW project. I Conceptual design, TPA M-51-03-T01, will be put at risk if this is not funded	0.000	0.029	0.063	0.411	0.474
FT	Adv Reac	6640 6642	302.50	4	**FFTF SODIUM DRAIN & STORAGE**	DOE directed FFTF to shutdown / Must be completed before Plant systems can be turned off	6.867	2.098	2.098	0.000	2.098
FT	Adv Reac	6640	302.50	4	**FFTF FUEL OFFLOAD**	DOE directed FFTF to shutdown / Must be performed before sodium can be drained from the Plant.	17.854	12.008	16.312	0.000	16.312
WM	SW	2200-0	296.50	2	**RMW Disposal ES & H**	Provides RCRA compliant disposal trenches for radioactive mixed wastes. Failure to fund leaves Hanford without radioactive mixed waste disposal capability	2.000	2.100	2.100	0.301	2.401

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Cat.								($ in Millions)			
FT	TRP	6623	294.50	2	**300 AREA EM Facility Support**	Maintain 12 buildings as required for Fissionable Materials Facility. Would lose ability to detect and control potential spread contamination	2.000	1.900	1.900	0.000	1.900
ER	ERC	3235	292.00	4	**200-ZP-1 Remediation**	Reduce worker risk, meet TPA; target case stops all pump & treat	3.110	1.000	1.000	3.000	4.000
ER	ERC	3200	292.00	4	**200-BP-1 Remedation**	Reduce worker risk, meet TPA	3.500	1.000	1.000	0.050	1.050
ER	ERC	3235	292.00	4	**200-ZP-2 Remediation**	Reduce worker risk, meet TPA, target case stops all pump & treat	3.620	2.000	2.000	1.167	3.167
ER	ERC	3230	292.00	4	**200-UP-1 Remediation**	Reduce worker risk, meet TPA; target case does not support IRM implementation or pump & treat	3.220	0.250	1.000	1.500	2.500
FT	Adv Reac	6640	286.00	4	**FFTF SYSTEMS SHUTDOWN**	DOE directed FFTF to shutdown / Must be completed before Plant is considered shut down	0.568	0.495	0.495	0.000	0.495
WM	ROM	7340-0	279.50		**Seismic Monitoring**	Maintains seismic surveillance of the Hanford Site and eastern Washington	0.397	0.337	0.397	0.078	0.475
WM	Plan. Int	7250	272.50		**Prioritization Planning Process**	Just Maintains alignment between site mission, customer values and goals, stakeholder, Indian Nation values and goals, and the priority system used in planning work at Hanford A defined system assists integration and decision making Imp Customer and external values would not be factored as a repeatable p/o prioritization Failure to consider concerns and values will reduce credibility of the budget and baselines	0.150	0.155	0.155	0.024	0.179
FT	Adv.Reac	6641	272.00	2	**308 BUILDING S&M**	Provides a safe and compliant facility / Ensures public and worker safety, as well, as environmental compliance	0.869	0.301	0.301	0.000	0.301
WM	An Serv	7100-0	268.00	2	**WSCF Facility Operations**	This activity provides for the routine operation, maintenance and repair of all facilities and equipment associated with the WSCF Facility to keep the facility in a ready-to-serve mode	6.500	6.695	6.695	0.000	6.695
WM	An Serv.	7100-0	268.00	2	**Program Integration**	Supports Analytical Services program management, quality assurance, and project support	6.972	5.088	6.160	0.000	6.160

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								($ in Millions)			
WM	An. Serv.	7100-0	268.00	2	**222-S Facility Operations**	This activity provides for the routine operation, maintenance and repair of all facilities and equipment associated with the 222-S Laboratory Facility to keep the facility in a ready-to-serve mode.	22.435	22.822	22.822	0.000	22.822
WM	An. Serv.	7100-0	268 00	2	**Analytical Services Facilities CENRTC**	This activity provides new, upgrade, or replacement equipment and instrumentation to keep abreast of new technologies, and to respond to programmatic needs	1.700	1.420	2.000	0.000	2.000
FT	Adv Reac	6640	265.00	2	**FFTF S&M**	Provides a safe and compliant facility./-Ensures public and worker safety, as well as environmantal compliance.	32.014	31.567	31.567	0.000	31.567
WM	Plan Int	7250	242 50		**Site Optimization**	Just Required to synthesize multiple program system designs to provide integrated solutions and to investigate site-level solutions meeting multiple program needs. Imp. Duplication of systems or non-optimization at the project/program level.	0.734	0.195	0.195	0.000	0.195
WM	SNFP	4110	241 50		**K BASIN MATERIAL REMOVAL**	Necessary for characterization associated with fuel, water, sludge, and debris. Provides the system acquisition for disposition of debris, sludge, fuel, and water. Installation and operation of removal systems are included. If not funded removal of fuel from the K Basins will not occur causing increased safety and environmental risk.	26.500	33.600	33.600	0.000	33.600
WM	TWRS	1200-0	240.00	6	**TWRS COMMUNICATIONS**	Communicate TWRS objectives/achievements.	1.300	1 038	1.123	0.450	1.573
WM	HEMP	7330	235.00		**Air/Water Permitting Coordination**	"Supports sitewide Clean Air Act & Clean Water Act permitting requirements Penalty for not maintaining FF-01 Permit ("knowing violation") required by WAC 246-247 is $10K/day and/or 1 year imprisonment/violation per RCW 70 94 431 (RL is permit holder). Penalties for not submitting and maintaining Air Operating Permit are $10K/day and/or 1 year imprisonment/violation (RCW 70 94 431) (state) and fines up to $500K and 5 years imprisonment (Section 113[c] of CAA) (federal) (RL is permit holder).	0.917	0.917	0.917	0.000	0.917

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Cat.								($ in Millions)			
WM	HEMP	7330	235.00	.	Hemp Program Management	Provides program management/financial administration and scheduling support fo r the HEMP. Loss of program coordination and continuity if not funded	0.273	0.273	0.273	0.000	0.273
WM	HEMP	7330	235.00		Environmental Reporting (2)	Regulatory noncompliance with aggregate Civil penalties and fines in excess of $100K per day per violation, aggregate Criminal penalties adn fines in excess of $150K or 1 year imprisonment per day per violation, or both; forfeiture of $110K in potential performance fees under the Annual Environmental Reporting Performance Based Initiative (PBI)	1.577	1.577	1.577	0.000	1.577
WM	HEMP	7330	235.00		RCRA Permit Compliance/Modification	As described in the Dangerous Waste Regulations, WAC 173-303-950, "Any violation of this chapter may be subject to the enforcement and penalty sanctions of chapter 70.105 RCW." Civil penalties includes fines of up to $10K per day for each violation and potential criminal activities could be prosecuted as a class B or class C felony	1.707	1.288	1.288	0.000	1.288
WM	HEMP	7330	235.00		RCRA Permitting Coordination	Criminal and civil penalties for inadequate consistency checks supporting certification requirements, and said penalties and interim status loss for not meeting MPM schedule. Also, failure to comply with reporting requirements and regulatory integration and precess improvement initiatives (e.g., TPA Initiative 9).	0.324	0.324	0.324	0.000	0.324
WM	TWRS	1200-0	233.00	2	TRAINING & QUALIFICATION	Comply with DNFSB Recommendation 92-4	0.300	0.408	0.370	0.154	0.524
WM	TWRS	1200-0	230.50	3	INFORMATION RESOURCES MGMT	Establish TWRS Information Resource Management Function	1.200	1.218	1.330	0.549	1.879
WM	Plan Int	7250	219.50		Integration Analysis - MYPPs	Just. Assesses integration of site program baselines with each other. Examines consistency with mission/values/goals presented in the HSP and HMP. Provides feedback to individual programs to assist integration with site efforts. Imp. Interface issues and inconsistencies will persist which reduces effectiveness and credibility towards execution of site mission	0.515	0.531	0.531	0.000	0.531

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								($ In Millions)			
WM	SNFP	4110	216.50		STAGING & STORAGE FACILITY	Necessary to provide a fuel staging and storage system located away from the columbia river for receipt and storage of approximately 2100 metric tons of spent nuclear fuel stored in multi-canister overpacks If not funded fuel will remain in the K Basins causing increased safety and environmental risk.	36.400	40.200	40 200	0.000	40.200
WM	SNFP	4110	216 50		CASK/TRANSPORTATION SYSTEM	Necessary to provide engineering and manufacturing support to develop, design, and construct fuel, sludge, and debris cask transportation system for K Basins. If not funded not funded no transportation system will be available for removal of fuel from the K Basins causing increased safety and environmental risk	7 400	6 500	6 500	0 000	6 500
WM	SNFP	4110	216 50		FUEL STABILIZATION FACILITY	Necessary to provide the engineering and construction support to develop, design, and construct the process systems and facility to stabilize the K Basin fuel If not funded fuel will not be processed into a stable condition acceptable for interim dry storage awaiting final disposition DOE objectives for Hanford Spent Nuclear Fuel will not be achieved	7 800	13.700	39 900	0 000	39 900
WM	SNFP	4110	216.50		SYSTEMS ENG/ENG INTEGRATION	Necessary for systems engineering functional analysis and engineering integration support for path forward activities If not funded the SNF Project systems engineering analysis does not identify the functions and requirements associated with the removal of fuel from the K Basins Lack of path forward engineering integration will result in delays from removing fuel from the K Basins.	3.100	3.200	3.200	0 000	3.200

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Cat.								($ in Millions)			
WM	SNFP	4110	216.50		**PROJECT MGMT/REG INTEG**	Necessary for development and documentation of an executable technical, schedule, and cost baseline consistent with the Systems Engineering technical basis. Financial planning, compiling, and documenting indicators for baseline performance Interface with the National SNF Program, maintaining regulatory integration, timely communication with the public, stakeholders, and regulators If not funded cost effective and effecient project controls will not occur.	6.800	6.900	6.900	0.000	6.900
WM	SNFP	4110	216.50		**MCO ACQUISITION**	Necessary to provide engineering and manufacturing support, both WHC and offsite contractors, to develop, design and construct MCOs for the spent fuel in the K Basins If not funded removal of fuel can not occur causing increased safety and environmental risk	2.300	8.500	8.500	0.000	8.500
WM	Plan Int	7250	215.00		**Strategic/Mission Analysis**	Just Assesses current mission and implementation strategies against budget and regulatory environment Coordinates development of alternative implementation strategies and analyses in support of site decisionmakers. Recommends revisions to site mission and produces implementation strategy guidance based on decision makers actions.	0.657	0.301	0.301	0.000	0.301
WM	HEMP	7330	215.00		**Environmental Field Services**	As described in the Dangerous Waste Regulations, WAC 173-303-950, "Any violation of this chapter may be subject to the enforcement and penalty sanctions of chapter 70.105 RCW" Civil penalties include fines of up to $10K per day for each violation and potential criminal activities could be prosecuted as a class B or class C felony	0.589	0.521	0.689	0.000	0.689
WM	Plan Int	7250	215.00		**Update Hanford Strat. Plan**	Just Supports the HQC and associated goal teams, and revises the HSP, which communicates the Site Strategic Plan to employees, programs, stakeholders, Indian Nations, and the public Imp Not funding causes inconsistent guidance to programs, and loses a vehicle for communicating with the stakeholders	0.157	0.295	0.295	0.000	0.295

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Cat.								($ in Millions)			
WM	Liquids	2300-1	207.00	4	**Phase II Stream BAT/AKART**	Supports Project W-252 construction of Phase II Streams BAT/AKART implementation for Tank Farms, B-Plant and 284-E Powerplant IMPACT Potential to miss TPA Milestone M-17-00B, continued unpermitted effluent discharge to B-Pond, sever impact to Project B-604 which was based on the effluent minimization benefits of W-252 Reduced scope being negotiated with regulators, may mitigate impacts	0.539	0.889	0.889	2.567	3.456
WM	SW	2200-0	202.00	2	**HAZ Waste Storage**	Provides for RCRA and TSCA compliant storage for a centralized Hanford facility to segregate and store non radioactive dangerous waste prior to offsite shipment Failure to fund leaves Hanford with noncompliant Solid Waste Management of dangerous wastes	3.209	3.095	3.095	0.474	3.589
WM	Plan Int	7250	188.50		**Allocate to Programs the WBS/CMM**	Just. The MVT and CMM are used to control, plan, and report activities associated with all programs at Hanford The MTV i'faces w/ EPDS to provide consistent/valid data. The CMM will i'face with P/X & provide consistency from planning and reporting Im If not funded continued inconsistencies in planning and reporting will continue with reports to be sent to RL, HQ, regulators, and public	0.259	0.267	0.267	0.000	0.267
WM	PNL	8400	187	2	**Essential ES&H Drawings**	Provides as-built drawings for the Hazard Class II Bldgs safety systems modifications and investigations of occurrences If not funded, health and safety hazards in the facility will not be corrected adequately	0.613	0.566	0.566	0.169	0.735
WM	PNL	8400	181.5	2	**Cultural Resources & HECA (Hanford Ecological Compliance Assessment)**	Regulatory requirement for protection of Hanford Site historical and Native American cultural resources and for protection of endangered wildlife, habitat, and vegetation. If not funded, fines and work stoppages may result	1.090	0.892	1.009	1.582	2.591

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CP WM ER FT	Program Name	ADS Num.	PPG Score	Grmbly Int.	Workscope Title	Justification / Impacts	Target Case Funded	Decre. Case Funded	Target Case Funded	Planning Case Unfunded	Total Program Require
Cat.								($ in Millions)			
WM	Plan Int.	7250	170.50		HSIS Maintenance & Analysis	Just. Prep. and Maintenance of HSIS, Level 0 sched and department schedules The HSIS is used to determine site critical paths via analysis of inter-program logical relationships in MYPP baseline schedules The Level) schedule illustrates the RI/HQ and TPA milestones thru FY2000 Imp. Not funding HSIS will adversely impact site integration of programs and critical path analysis Not funding Level 0 sched would impact the summarization and reporting of milestone progress	0.693	0.714	0.714	0.000	0.714
FT	Adv Reac	6643	163.00	2	309 BUILDING S&M	Provides a safe and compliant facility / Ensures public and worker safety, as well, as environmental compliance	0.655	0.675	0.675	0.000	0.675
WM	Plan Int	7250	156.00		MYPP Admin/Validation	Just Provides the direction and coordination of the MYPPs which are the programmatic baseline documents for Hanford Also includes the independent review and assessment of baselines MYPPs are required by RL as p/o SMS Imp Not funding this activity would result in the lack of direction and coordination for preparation of tech/cost/sched basis for the major work @ Hanford, or in non-validatable baseline data	0.634	0.638	0.638	0.000	0.638
WM	Liquids	2300-0	156.00	4	200 A Upgrades/New Feed Definitions	Supports investigation of potential new feeds into 200 Area ETF or TEDF for treatment and disposal Supports upgrades to these facilities including completion of prior year GPPs Provides minimum System Engineering Interface for program IMPACTS Limits facility flexibility to expand support to cleanup mission and waste minimization efforts	3.583	0.500	0.721	5.402	6.123
WM	Plan Int.	7250	152.50		Site Budget Planning/Prioritization	Just. HQ required deliverable which involves establishment of workscope priorities based on mission objectives and used as direct input to the ADSs for budget determination. Imp. Not funding makes non-compliant with HQ directives.	0.383	0.394	0.394	0.000	0.394

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Cat.								($ in Millions)			
WM	Liquids	2300-0	141.50	4	**Miscellaneous Streams**	Continues implementation of the Plan and Schedule for Disposal and Regulatory Compliance of Miscellaneous Streams Tasks include implementation of Best Management Practices and WAC 173-216 permit submittals IMPACTS Consent Order DE 91-NM-177 milestones would be delayed Potential to result in fines and cease discharge orders for these streams impacting PUREX, Tank Farms, UO3, 222S and steam distribution systems	0.183	0.191	0.191	0.000	0.191
WM	An Serv	7100-3	137.50	2	**219 Tank Upgrades (W-178) TPA M-32 (95 LI)**	This project will provide the 219-S Facility with secondary containment for Tanks 101, 102, and 103 The project is required to support the TPA Milestone M-32 and the Part B permit for the 222-S Facility	1.260	0.100	0.100	0.000	0.100
WM	Plan. Int.	7250	126.50		**ADS Prep/Coord**	Just. Direction, coordination and technical review of ADSs - the vehicle to request funding for Hanford Imp Not funding will affect hanford's ability to participate in the DOE budget development process	0.693	0.775	0.775	0.000	0.775
WM	PNL	8400	124	2	**Pollution Prevention Program**	Regulatory requirement for pollution prevention program. If not funded, the RCRA hazardous waste manifest cannot be approved resulting in the inability to ship hazardous and radioactive mixed waste to disposal/storage facilities.	0.448	0.436	0.436	0.130	0.566
WM	SNFP	4110	118.00		**OTHER HANFORD FUEL**	Necessary to provide the interface control and engineering support to develop an overall plan on characterization, packaging, and transportation of Hanford spent fuel not stored at K Basins If not funded DOE objectives will not be acheived associated with Hanford Spent Nuclear Fuel.	1.300	1.200	1.200	0.000	1.200
WM	Plan. Int	7250	88.00		**Remedial Phase Risk Assessment**	Just. Comparison of public/worker/ecological risks during remedial actions will be made to baseline which will allow involved parties to gauge impacts of remediation vs risk s without remediation Imp Eliminates objective ability for DOE to determine if remediation will increase/reduce net risk from the site	0.471	0.561	0.561	0.000	0.561

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CP WM ER FT	Program Name	ADS Num.	PPG Score	Grmbly Int.	Workscope Title	Justification / Impacts	Target Case Funded	Decre. Case Funded	Target Case Funded	Planning Case Unfunded	Total · Program Require
Cat.								($ in Millions)			
FT	Adv.Reac	6641	86.50	2	LEGACY OCCUPANCY	Provides landlord support for facilities partically occupied by DOE NE non-reactor equipment./ Primarially worker protection	0.098	0.101	0.101	0.000	0.101
WM	Plan. Int.	7250	85.00		Public Involv.t (Pp148/149)	Just. Required by TPA Pp. 148/149 to provide budget information to the public and interested parties. Imp. Violation of TPA specific requirement.	0.110	0.114	0.114	0.150	0.264
WM	Liquids	2300-0	74.00	6	Tritium Study M-26-05	Evaluates tritium removal technology and prepares yearly status report. IMPACT. TPA M-26-05 milestone would be missed.	0.134	0.138	0.138	0.000	0.138
WM	Plan. Int.	7250	66.00		SMS Exec Smry/Critical Items Rpt	Just Required by RLIP 5000 5 and 5000.7. Imp Violation of RL directives.	0.321	0.331	0.331	0.000	0.331
WM	Plan. Int.	7250	64.50		Site Model Develop - SE	Just. Site wide models are required to support the decision process Imp Proceeding with development of site activities without full site impact analysis through the use of these models may create a condition where excessive or inadequate design may result.	1.146	0.697	0.697	1.655	2.352
WM	Plan Int	7250	61.00		PTS Admin	Just. HQ-mandated reporting req't, specified in 105 Stat 1290 Sec 3135(a), DOE Order 2250 1c, DOE Order 4700 1. Imp Non-compliance along with inconsistent reporting within the DOE complex	0.561	0.578	0.578	0.000	0.578
WM	Plan Int.	7250	56.50		Tech B/L Requirements Anal	Just Used as the basis for continued development and updating the site and program system specifications. Imp. New or revised changes in requirements will not be factored into the system designs There would exist no method for obtaining requirements relief in the baseline system or for evaluation of design acceptability against established requirements.	0.000	0.138	0.138	0.494	0.632

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Cat.								($ in Millions)			
WM	Plan. Int	7250	48.50		Risk Management	Just Supports RL develop and implement a risk-based decision making process Works with IRAP and other risk activities to develop a site total risk picture. Assists Systems Engineering evaluate alternatives, provide linkage to other risk activities, and solidify public values and concerns in the technical baseline and studies Imp. Unable to provide response to RL and HQ interests in risk-based decision making at the site level Unable to support allocation of resources to mitigating greatest risks.	0.314	0.169	0.169	0.216	0.385
WM	Plan Int	7250	46.00		Manage Systems Upgrades/Oversight	Just Project Mgt function for coordinating EPDS operation and platform/module development activities Includes upgrades, tech spt, and development of standards for the EPDS platform Just Not funding would create a condition where Hanford data could not interface with other DOE sites' data.	0.497	0.443	0.443	0.379	0.822
FT	Adv Reac	6641	44.50	4	RCRA CLOSURE ACTIONS	Provides environmental management of three NE hazardous waste facilities / Has EPA and the Washington Department of Ecology involvement.	0.761	0.100	0.100	0.000	0.100
WM	Plan Int	7250	42.50		Sched. System Core Support	Just Implementation, product revision, and control of P/X. Provides on-site assistance, hot-line coverage, testing, evaluation and release of modifications Imp Jeopardize of a site-wide scheduling system Coordination of s/w maintenance and upgrades would not occur as product matures	1.686	1.714	1.714	0.000	1.714
WM	Plan Int	7250	26.00		Maintain SE Infrastructure	Just Maintain the SEMP, SEM, and CMP, and development and conduction of training Imp Proper training and implementation of SE procedures is required to sustain the configuration of the technical baseline	0.063	0.069	0.069	0.000	0.069

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								($ in Millions)			
WM	Plan. Int.	7250	uns.		**Program Management**	Just. Provides baseline planning, coordination, change control, and reporting. Provides resources to coordinate the MYPP/ADS/SMS/PTS/other programmatic activities. Imp. Program would be unable to develop budget requests, maintain baselines, and report progress.	0.390	0.366	0.366	0.000	0.366
FT	TRP	6624	N/A	6	**PFP IAEA**	Necessary to meet the intent of implementation of international safeguards at PFP. If non funded IAEA vault upgrades could not be accomplished should PFP be choosen as an IAEA site.	1.000	1.000	1.000	0.000	1.000
FT	Adv Reactor				**Adv.Reactor Productivity Commitment**	ADSs already incorporate $3.1M achieved savings for FY 1996 and $7.4M for FY 1997	(3.662)	(2.646)	(3.120)		(3.120)
FT	TRP				**TRP Productivity Commitment**		(0.700)	(4.000)	(4.000)		(4.000)
WM	TRP	4190-0			**TRP Productivity Commitment**		(4.000)	(4.300)	(4.300)		(4.300)
WM	ROM	7340-0			**Program Management**	Provide for central coordination of Program Activities	0.954	0.773	0.850	0.914	1.764
CP	HAMMER	2604		2	**HAMMER Operations and Program Management**	Provides funding to support the HAMMER operations and program management	2.664	3.109	3.159	0.000	3.159
CP	Transport	2601		2	**Transportation Program**		3.70	3.30	3.92	4.66	8.58
CP	Anal Ser	2603		2	**Analytical Services**		2.50	0.77	0.91	0.00	2.20
CP	HAMMER	2604		2	**Training & Education**	Provides funding for X&T Universities. IMPACT: Delay development of model DOE training and education programs for worker health and safety	4.200	0.384	1.000	0.000	1.000
CP	HAMMER	2604		2	**HAMMER Project**	Provides funding to support the HAMMER Project. IMPACT. Delay the completion of the HAMMER facility construction by one year and increase the TPC by approximately $ 7M (scheduled completion would move from 7/97 to 6/98)	15.677	7.970	9.377	0.000	9.377
						TARGET 1997					

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Cat.								($ in Millions)			
WM	TWRS	1120-0	1404 00	2	**Compressed Air Systems -- SI 4b35 / Change Trailer Mods**	Justification: Crucial Activity associated with safe storage of Tank Waste. This work ensures continued operation of safe storage of Tank Waste Impact. Crucial activity for safe storage of Tank Waste wil not be managed.	0 000		0 500	0.700	1.200
WM	TWRS	1100-0	1404 00	1	**SST Monitoring Improvements**	Justification: Crucial Activity associated with safe storage of Tank Waste. This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed.	1 030		0 744	-0 143	0 601
WM	TWRS	1100-0	1404.00	2	**Tank Farm Security**	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed.	0.180		0.100	0.072	0.172
FT	TRP	6620	906.00	2	**PRGM MGMT SAS (EM)**	Non-plant specific SAS. Includes Preparation of the Material Management Plan an material inventory lists, off-site packaging and shipping of nuclear material, and SARP's If non funded SAS administration & technical support would not occur.	1.100		1.100	0.000	1.100
MW	TWRS	1240-0	752 00	5	**Technology Dev Management**	J. Manage HLW technology development. I: If not funded there would not be any HLW technology development. Complete melter development, TPA M-51-02, would be delayed 1 year if not funded	1.085		0.720	0.034	0.754
WM	TWRS	1210-0	749.5	1	**W-314 scope transfer to Retrieval Program**	Provide Infrastructure Upgrades in order to successfully deploy SST Retrieval Systems. Impact: Will delay M-45-05 series TPA milestones if not funded.	1.000		1.600	0.000	1.600
WM	TWRS	1230-0	749.50	4	**Proof-of-Principle**	J-Develop an alternate should planning case funding not be provided and to allow for a 'try before buy' option to TWRS Treatment and Disposal mission I-Increased risk for Treatment and Disposal	0.000		13.700	0 000	13.700

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CP WM ER FT Cat.	*Program Name*	*ADS Num.*	*PPG Score*	*Grmbly Int.*	Workscope Title	Justification / Impacts	*Target Case Funded*	*Decre. Case Funded*	*Target Case Funded*	*Planning Case Unfunded*	*Total Program Require*
								($ in Millions)			
WM	TWRS	1230-0	625.50	4	PILOT SCALE VIT PLANT	J-Design and fabricate LLW pilot scale vitrification system. This system will be utilized in glass formulation virification, constuction of facility, and training I-Impact for budget reduction in this activity would be a delay to design and construction M-60-03 and M 60-04 of facility based on the strategy of having the AE/CM building the pilot plant if necessary	0.771		1.179	2.141	3.320
WM	TWRS	1240-0	625.50	5	HLW Technology transfer	J Provide for technology transfer and lessons learned from DWPF I If not funded valuable data, technologies and lessons learned will not be transferred to contractors developing the HLWVP	0.000		0.446	0.000	0.446
ER	ERC	3400	483.00	5	Technology Demonstration	Required to adapt existing and new technologies to site-specific use for timely and cost effecitve completion of ER projects	3.480		1.026	3.604	4.630
FT	Landlord	6680	462.00	2	Line Item ID & Scoping	FY 96 and 97. Prepare engineering reports, cost estimates, schedules, plans and life cycle cost analysis for infrastructure projects Includes updating baselines for ongoing projects, maintaining baselines for proposed projects, evaluating cost effective alternatives to resolve infrastructure problems and developing baselines for infrastructure transition.	0.728		0.385	0.508	0.893
ER	ERC	3120	374.00	4	100 NPL Common Assessment	Reduce worker risk, meet TPA	0.000		0.750	0.350	1.100
FT	Adv.Reac	6643	315.00	4	309 BUILDING DEACTIVATION	DOE declared 309 Building a surplus hazardous facility /Failure to perform stabilization work increases the risk of contaminating the environment and harming the health and safety of the workers	1.090		1.894	0.000	1.894
WM	TRP	4190-0	280.00		B PLANT TRANSITION	Provides for B Plant to transition to a standby mode. If unfunded, the existing source term would remain in the present condition resulting in continued higher hazard classification and the cost of surveillance and maintenance would not decrease	2.400		0.400	5.000	5.400

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								($ in Millions)			
WM	An. Serv.	7100-0	271.00	2	222-S Facility Renovations	Capacity upgrades are required to support at the ready-to-serve level Room renovations are an ongoing program with at least 4 room renovations planned per year to maintain the capability of the Laboratory to support the long term mission.	3 200		1.894	2.000	3.894
WM	An. Serv.	7110-0	268.00	2	222-S Waste Water (W-XXX)	Engineering study to evaluate flows in the 222-S facility. The study will recommend system elimination and/or enhancements.	0.064		0.063	0.000	0.063
WM	An. Serv.	7110-0	268.00	2	WSCF Upgrades (W-XXY) (01 LI)	Provides for outyear upgrades in the WSCF Facility.	0.000		0.094	0.000	0.094
WM	SW	2200-0	232.50	2	RMW Treatment	Provides for contract to a commercial entity for preparation of thermal treatment services of radioactive mixed wastes /Failure to fund delays radioactive mixed waste thermal treatment capabilities resulting in additional storage needs	4.100		2.290	9.988	12.278
WM	An. Serv.	7100-0	219 50	2	GPP Small Projects	Upgrades necessary to maintain the laboratories for extended life service.	0.500		1.500	0.000	1.500
WM	HEMP	7330	215.00		NEPA Site Coordination	Maintains integrated record of NEPA/SEPA documentation for Hanford Site. Impact if not funded potential stop work situations or delays if required NEPA/SEPA review is overlooked or done incorrectly due to ignorance of requirements Supports excavation permit review for small earth disturbing activities. Potential violations of cultural resources and threatened and endangered species requirements with associated fines, penalties and potential stopped work Potential violation of NEPA regulations	0.284		0.495	0.000	0.495
WM	HEMP	7330	215 00		TPA Integration (1) (3)	Funding required to support Tri-Party Agreement Hanford Site integration Failure to provide adequate support to LEF, SW, TWRS, SNF may impact coordination of TPA implementation and negotiations with regulators	0 729		0.137	0 487	0 624

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Cat.								($ in Millions)			
WM	PNL	8400	192.00	2	**Facilities, Industrial Hygiene & Safety**	Regulatory requirement for testing eyewa :h and safety shower flush lines, asbestos survey and remediation, MSDSs, and other industrial hygiene safety concerns. If not funded, unacceptable worker safety conditions could occur	1.071		0.326	0.097	0.423
FT	TRP	6623	185.00	4	**300 AREA Shutdown**	Activities to prepare 12 buildings to meet criteria for transfer to HSFP If not funded, facilities will not be deactivated and S&M costs will continue	1.100		2.100	0.000	2.100
WM	Plan Int	7250	184.50		**Site Staffing Mgt**	Just. Involves the identification and tracking of staff, by programmatic baselines, including retirements, voluntary retirements, staff reductions, etc This info is accumulated and reported monthly and provides for the application and redistribution of resources Imp Not funding would adversely impact the allocation of resources required for the efficient and cost effective implementation of identified workscope.	0.106		0.109	0.000	0.109
FT	Adv Reac	6641	176.00	4	**NE LEGACIES**	Strategy development and implementation for the disposition of DOE NE non-reactor facilities and associated materials/equipment / No disposition.	1.572		2.157	0.000	2.157
WM	TRP	4190-1	171.00		**B PLANT - W-059**	Provides for Safety Class Ventilaiton Upgrade (W-059) FDC, CDR, and definative design review Violation of DOE Orders, CAA, TPA, and WAC regulations would result if unfunded	0.200		2.600	0.000	2.600
WM	An. Serv.	7100-0	130.50	2	**LIMS Implementation**	The Laboratory Information System (LIMS) is required to replace the outdated system at 222-S and provide a new system for WSCF This project is currently ongoing with continued implementation of new features and functionality through systems configuration and development activities	1.154		1.110	0.000	1.110
WM	TRP	4195-0	108.00		**B PLANT - CESIUM**	Provides for the return of all leased cesium and strontiup cpsules from ARECO and other DOE facilities, cesium program management WESF preparadness, and PNL surveillance If unfunded, DOe-HQ will not meet committments made to various states	2.100		0.600	0.000	0.600

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Cat.								($ in Millions)			
WM	Plan. Int.	7250	99.50		Tech Baseline Maint/Integration	Just Provide consistent set of direction and guidance to site programs with respect to required systems design and SE activities. Imp Lack of integration will result in incomplete and undocumented program interfaces.	0.063		0.069	0.000	0.069
WM	An. Serv.	7110-0	93 00	2	222-S Anc. Equip. Add (W-367) (98 LI)	Provides the 222-S Facility with an addition that will provide manipulator repair and storage, equipment decontamination and storage, and laundry storage capability.	0.499		0.062	0.000	0.062
WM	Plan Int.	7250	67.00		Risk Validation for Priority Planning	Just. Validate the PPG scorings with consistent methods, assumptions, and data to aid in developing objective risk estimates in the preparation of site budgets Imp Current criticisms of the PPG process (subjective scoring) will continue without aid of objective analysis, and values of PPG scoring will be diminished.	0.320		0.281	0.000	0.281
WM	Plan Int	7250	64 50		SE Design Review and Approval	Just Review program and project designs to verify that they meet specified site requirements Imp May result in development of systems designs that do not meet site requirements.	0.240		0.138	0.294	0.432
WM	Plan. Int	7250	62 50		MCS Support/Surveillance/Train	Just. Contractual obligation to provide MCS. Provides MCS support and guidance to all users Provides for surveillance required by RL directives Develops necessary MCS training materials for QTRC employment. Imp If not funded there would be no support for MCS processes and contractual reporting obligations	0.537		0.560	0.000	0.560
WM	Plan Int	7250	49 50		Prog. Reqts Specs	Just. Resolution of key issues (enabling assumptions, decision points, problem areas, etc) must be accomplished prior to issuance of top-level specifications. Imp System design delays and increased costs	0 000		0.511	1.283	1.794

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Cat.								($ in Millions)			
WM	Plan. Int.	7250	48 50		PPG ENHANCEMENTS	Just Provides enhancements to the Priority Planning Grid, based on a risk-managed perspective. IMP. Prioritization of site-wide activities will not benefit from the risk-based perspective	0.000		0 100	0 000	0.100
						PLANNING 1997					
WM	TWRS	1110-0	1657 00	1	Characterize Organic in Flammable Gas	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0 209			0 000	0 000
WM	TWRS	1110-0	1657 00	1	Portable Exhauster for Flammable Gas Tanks SSTs	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0 396			0 000	0.000
WM	TWRS	1110-0	1657 00	1	Install Video System Upgrades in Flammable Gas Tanks	Justification: Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0 632			0 000	0 000
WM	TWRS	1110-0	1582 00	1	VDDT Removal	Justification Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0 450			0 000	0 000

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Cat.								($ in Millions)			
WM	TWRS	1110-0	1582.00	1	**Install AW Farm Ventilation Upgrades (SI-2f / SI-2k)**	Justification: Crucial Activity associated with safe storage of Tank Waste. This work monitors Tank Waste to ensure continued operation of safe storage Impact: Crucial Activity to ensure monitoring of Tank Waste will not be managed.	0.926			0.000	0.000
FT	Landlord	6661-0	1535 00	3	**Electrical Utilities**	FY 97. Operation and maintenance of the Hanford electrical transmission and distribution system.	0.000			5.926	5.926
WM	TWRS	1280-AA	1404 00	2	**W-236a Multi-Waste Treatment Facility (TPA M-42-00)**	Justification: Crucial Activity associated with safe storage of Tank Waste. This work ensures continued operation of safe storage of Tank Waste Impact. Crucial activity for safe storage of Tank Waste wil not be managed	0.000			113.491	113.491
WM	TWRS	1120-0	1404 00	2	**Resolve Site Electrical Assessment Issues**	Justification: Crucial Activity associated with safe storage of Tank Waste. This work supports the managing of Tank Waste to ensure worker safety Impact. Crucial Activity associated with ensuring worker safety will not be managed.	0.000			2.000	2.000
WM	TWRS	1130-0	1404.00	1	**Off-Site Labs (INEL)**	Justification: Crucial Activity associated with safe storage of Tank Waste. This work identifies/characterizes waste to maintain safe storage Impact: Crucial activity for waste identifecation will not be managed	0.000			0.000	0.000
WM	TWRS	1130-0	1404 00	1	**Off-Site Repackaging/Shipping**	Justification: Crucial Activity associated with safe storage of Tank Waste This work identifies/characterizes waste to maintain safe storage Impact. Crucial activity for waste identifecation will not be managed	0.000			0.100	0.100
WM	TWRS	1100-0	1404 00	1	**SST Emergency Pumping**	Justification: Crucial Activity associated with safe storage of Tank Waste This work ensures continued operation of safe storage of Tank Waste Impact Crucial activity for safe storage of Tank Waste wil not be managed	1.000			0 858	0 858

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								($ in Millions)			
WM	TWRS	1130-0	1404 00	1	**Lab Readiness**	Justification: Crucial Activity associated with safe storage of Tank Waste This work identifies/characterizes waste to maintain safe storage Impact Crucial activity for waste identifecation will not be managed	0 000			0 000	0 000
WM	TWRS	1100-0	1404 00	2	**Retired Facilities**	Justification. Crucial Activity associated with safe storage of Tank Waste This work monitors Tank Waste to ensure continued operation of safe storage Impact Crucial Activity to ensure monitoring of Tank Waste will not be managed	0 000			0 000	0.000
FT	Landlord	6661-0	1300 00	3	**Fire & Emergency Services**	FY 97 Provides life safety and property protection services to the 560 square mile Hanford site on a 24 hour a day, 7 day a week basis	0 000			12 980	12 980
WM	TWRS	1120-0	965 00	2	**Configuration Management**	Just: Essential Activity associated with improving WT material conditions for safe storage This work upgrades tank equip to ensure continued integrity of waste storage Impact Essential Activity cont'd integrity of waste storage will not be managed	0 000			0 000	0 000
WM	TWRS	1130-0	965 00	1	**222-S Lab Upgrades/LIMS**	Justification. Essen Acty assoc w/ improving WT material conditions for safe storage This work transitions activities to prepare for Retrieval of Waste & reduce costs Impact. Essen Activities for improving WT material conditions will not be managed	2.658			2 200	2 200
WM	TWRS	1130-0	965.00	1	**325 Lab Upgrades**	Justification: Essen Acty assoc w/ improving WT material conditions for safe storage This work transitions activities to prepare for Retrieval of Waste & reduce costs Impact Essen Activities for improving WT material conditions will not be managed	0 000			0 000	0.000
WM	SW	2200-1	887 50	2	**Wst Stor & Infrstr (W-112)**	Provide RCRA compliant storage and material handling of waste containers / Funding required to support sufficient "compliant" storage	8.100			27 317	27.317

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Cat.								($ in Millions)			
WM	TWRS	1130-0	829.00	1	**Characterization Methods Development - PNL**	Justification. Needed Activity to manage enhanced safe storage This work supports the storage of Tank Waste to enhanced requirement of safe storage Impact. Needed Activity to support storage of Tank Waste to enhanced requirements will not be managed	0.000			0.000	0.000
WM	TWRS	1130-0	829.00	1	**Disposal DQO Analysis**	Justification: Needed Activity to manage enhanced safe storage. This work supports the storage of Tank Waste to enhanced requirement of safe storage Impact Needed Activity to support storage of Tank Waste to enhanced requirements will not be managed	0.000			0.500	0.500
WM	TWRS	1100-0	829.00	2	**Light Duty Utility Arm**	Justification: Needed Activity to manage enhanced safe storage This work identifies Tank Waste to prepare for Retrieval Impact Needed Activity to identify Tank Waste to prepare for Retrieval will not be managed.	0 000			0.773	0.773
WM	TWRS	1210-2	749.50	1	**W-151, AZ-101 RETRIEVAL**	Provide design, procurement, construction, installation, and startup of sludge mobilization and tank monitoring equipment and facilities for sludge mobilization operations in tank 101-AZ Demonstrate mixer pump operation/sludge mobilization of NCAW waste, develop equipment and procedures for removal of tank internal components, and obtain test data on tank parameters Information obtained will provide the basis for pretreatment and subsequent retrieval activities Impact Delay to pretreatment activities	0 500			0.000	0.000
WM	TWRS	1220-0	749 00	4	**HLW Pretreatment Development for Reference Process - Colloid Tests/Sludge Science**	J Data from these test will be used in trade studies that determine the acceptability of enhanced sludge washing, supporting M-50-03. I. Lack of this work jeopardizes the operation of the LLW pretreatment and potentially increases the volume of waste that will go to HLW vitrification	1 900			1 900	1 900

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								($ in Millions)			
WM	SW	2250-0	740.50	2	Phase 6 Retrieval (W-318)	Solid Waste Projection Model predicts a shortfall in RCRA compliant storage by the year 2002 / If not funded, insufficient RCRA compliant storage capacity will occur by FY 2002.	0.000			0 345	0.345
ER	ERC	3125	687 00	1	100-NR-ERA	Reduce worker risk, comply with state & federal reg's.	1.190			14 495	14.495
FT	Landlord	6660	655.50	1	Mapping Services (SIMR)	FY 96 and 97. Ensures accurate base maps to prevent electrical shock or rupture of water lines during excavation/construction activities.	0 000			3.361	3.361
WM	SW	2250-0	633.50	6	LLW Burial Grd Closure (W-329)	Supports the requirements of the Burial Ground Part B Permits and allows for relocation of infrastructure that will be impacted by the burial ground closure activities / If not funded, the WAC closure requirements will not be met	0 000			1.028	1.028
WM	SW	2250-0	627 50	2	Spec Case MW Facility (W-349)	This facility provides storage capacity at the CWC to support the 324 building B-Cell cleanout of greater than class C mixed wastes / If not funded, unresolved seismic mitigation issues could result in off-site releases	0 000			0 750	0 750
WM	TWRS	1240-0	625 50	4	Process system Requirements and Concepts	J Perform trade studies and pre-conceptual engineering needed to define HLW process and facility requirements and concepts I. Conceptual design, TPA M-51-03-T01, will be delayed 2 years if not funded.	0.000			2 049	2.049
WM	TWRS	1230-0	625.50	4	FACILITY OPN (VIT)	J-This activity provide ongoing support to vitrificatio facility design and construction activities Includes operability and maintenance interface, input to he project and documentation review support. In addition, this activity includes planning for plant operations (training plans, maintenance plans, operations plans) I-Cumulative impacts to M-60-05 and M 60 00	0.105			0.150	0 150
WM	TWRS	1240-0	625.50	5	HLW Vitrification Dev Support for Design	J Develop, test and evaluate vitrification system process/equipment options I: TPA milestone M-51-02, select reference melter, would be delayed year if not funded	0 000			3 720	3 720

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Cat.								($ in Millions)			
WM	TWRS	1240-0	611.00	3	**Project Management**	J. Manage the HLW project and maintain project documentation. I. TPA milestone M-51-03-T01, HLW conceptual design will be delayed 1 year if this is not funded	0.000			1.495	1.495
WM	TWRS	1240-0	611.00	4	**Conceptual Design**	J. Prepare Conceptual Design of a HLW Vitrification facility and CDR documentation I. TPA milestone M-51-03-T01, conceptual design could be delayed if this is not funded.	0.000			6.256	6.256
WM	TWRS	1240-0	611.00	4	**Plant/Process Engineering/Design Support**	J. Provide systems engineering and design support. Directly supports conceptual design I: Conceptual design, TPA M-51-03-T01, will be delayed a year if not funded.	0.000			0.415	0.415
WM	TWRS	1240-0	611.00	5	**HLW Melter Development Risk Reduction**	J. Develop, test and evaluate vitrification system process/equipment options including a scaled up melter. I: If this is not funded TPA milestone M-51-02, select reference melter, will be at risk due to curtailed Melter testing.	0.000			2.740	2.740
WM	TWRS	1220-0	610.50	3	**Technical Integration & Planning**	J. Provide program oversight and integrate pretreatment acitivity requirements. I: Planning and program element management would not be performed.	0.000			1.825	1.825
WM	TWRS	1220-0	610.50	4	**Engineering Studies/F&Rs - In-Tank Sludge Wash Test**	J. Needed to provide a final design description with sufficient detail to provide a firm technical basis for follow-on design activities I. Delays start of design acitivities for LLW and HLW pretreatment facilities as well as enhanced sludge washing.	0.500			5.200	5.200
WM	TWRS	1220-0	610.50	4	**LLW Pretreatment Development for Enhancements - Other Radionuclide Removal CENRTC**	J. Needed to support Definitive Design for LLW Pretreatment facility I: Potentially delays LLW processing	0.084			0.084	0.084

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CP WAI ER FT Cat.	Program Name	ADS Num.	PPG Score	Grmbly Int.	Workscope Title	Justification / Impacts	Target Case Funded	Decre. Case Funded	Target Case Funded	Planning Case Unfunded	Total Program Require
								($ in Millions)			
WM	TWRS	1220-0	610.50	4	HLW Pretreatment Development For Enhancements and Alternatives - Improved Separations	J. Support of activities to reduce HLW glass volumes and supports completion of TPA Milestone M-50-03 I. Delays completion of TPA Milestone M-50-03	0.000			2.600	2.600
WM	TWRS	1220-0	610.50	4	Engineering Studies/F&Rs - Update F&R/DRDs	J: Needed to provide a final design description with sufficient detail to provide a firm technical basis for follow-on design activities I. Delays start of design acitivities for LLW and HLW pretreatment facilities as well as enhanced sludge washing	2.800			1.800	1.800
WM	TWRS	1220-0	610.50	4	HLW Pretreatment Development For Enhancements and Alternatives - Advanced Separations	J: Support of activities to reduce HLW glass volumes and supports completion of TPA Milestone M-50-03 I: Delays completion of TPA Milestone M-50-03	3.200			1.000	1.000
WM	TWRS	1220-0	610 50	4	Design Engineering - PSE HLW Pretreatment	J: Supports Completion of TPA Milestone M-50-04-T01, CDR HLW pretreatment facility Concurrent design with CDR LLW pretreatment facility ensures proper and timely integration of requirements I Creates possible disconnect between design of LLW pretreatment and HLW pretreatment (e g both LLW and HLW handling in each facility).	0 000			0.783	0.783
WM	TWRS	1220-0	610.50	4	HLW Project Management	J: Supports Completion of TPA Milestone M-50-04-T01, CDR HLW pretreatment facility. Concurrent design with CDR LLW pretreatment facility ensures proper and timely integration of requirements I Creates possible disconnect between design of LLW pretreatment and HLW pretreatment (e g both LLW and HLW handling in each facility)	0.000			0 240	0.240
WM	TWRS	1110-0	606.00	1	DST/SST Stabilization	Justification: Crucial Activity associated with safe storage of Tank Waste. This work monitors Tank Waste to ensure continued operation of safe storage Impact: Crucial Activity to ensure monitoring of Tank Waste will not be managed	2.955			0.000	0.000

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Cat.								($ in Millions)			
WM	SW	2200-2	588.00	2	Waste Retrieval (W-113)	Provide facilities and equipment for retrieval, gas sampling and NDE/NDA of TRU currently stored in the Solid Waste Burial Ground /Funding required to prevent further container degradation resulting in higher costs for future retreival activities.	0.000			8.270	8.270
WM	SW	2220-1	582.00	2	WRAP 2A Start-Up/Operations (W-100)	Provides the required support to commence WRAP 2A operations on or before 9/99, to meet M/S M-19-00; provides operations and maintenance of the WRAP 2A facility / Failure to fund requires renegotiation of TPA M/S M-19-00.	0.000			2.340	2.340
WM	SW	2230-1	582.00	2	WRAP 2A Construction (W-100)	Complete construction activities in 9/98, and perform activities in support of a 9/99 startup.	0.000			31.600	31.600
FT	Landlord	6680-14	566.00	2	L-094, Hanford Fire Dept Facility	FY 97: Replaces 200 and 300 Area fire stations that are 1940 vintage, resulting in greater cost efficiency and more effective emergency response. Current stations have inadequate living quarters, with leaking roofs, lead paint, asbestos, and exposed electrical systems. Consolidation of stations will provide for cost efficiency and more effective emergency response.	0.000			1.995	1.995
WM	ROM	7340-0	559.00		Vadose Zone Monitoring	Provides vadose zone monitoring to detect and track contaimination spread; reduces need for expensive core sampling on site	1.008			1.347	1.347
WM	SW	2250-0	513.00	2	Long Length Equipment Storage (W-373)	Provides a storage pad for long length contaminated equipment awaiting WRAP 2B process capacity. If not funded additional RCRA compliant storage facilities will be required.	0.000			1.050	1.050
FT	Landlord	6660	484 50	2	Capital Asset Management Process (CAMP)	FY 96: 48 CFR, Part 970.5204-06, Facilities Management Unfunded: Expansion of CAMP requirement per 48 CFR 970, Facilities Management and DOE 4320.2, "CAMP," to other programs cannot be accomplished, i e., graded implementation non-compliance with code of federal regulations	1.283			0.000	0.000
WM	ROM	7340-0	471 00		Well Drilling Support	Provides for groundwater well installation in accordance with 40 CFR	2 055			3.425	3 425

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Cat.								($ in Millions)			
WM	SW	2250-0	435 00	2	**WRAP 2B (W-255)**	Provides a large hot cell to process remote handled TRU and boxed TRU waste / Ifnot funded, additional storage capacity will be required for RH-TRU instead of disposal. TPA M/S M-33-00 will address this facility	0 000			1.990	1.990
FT	Landlord	6665	424.50	2	**NEC Compliance**	FY 97: Electrical component replacement in PNL facilities that could lead to worker injury/fatality and process failure	0.000			0.750	0 750
WM	SW	2250-0	393.50	2	**Phase 2 Retrieval (W-221)**	Provides the 2nd phase of TRU retrieval from the low level burial ground specifically addressing the RINM identified in the Spent Fuel Vulnerability Study / Impact is further container degradation resulting in higher future retrievel costs and potential PU release to the ground.	0.000			2.433	2.433
ER	ERC	3530	386 00	1	**300 Area D&D**	Reduce worker risk, comply with state & federal reg's.	0 000			0 400	0 400
WM	SW	2200-0	377.50	2	**TRU Characterization**	Provide pilot retrieval of TRU waste drums to generate information on retrieval techniques, container integrity and baseline waste characterization /Failure to fund results in full scale retrieval being planned to the most conservative design features to address unknown risks	0.000			3.205	3.205
FT	TRP	6620	374 50	6	**WASTE MINIMIZATION**	Identify priority waste streams and perform pollution prevention opportunities; report results to DOE and regulators. If not funded will be out of compliance with DOE Orders. 5400 1 and 5820 2A	0.000			0.100	0.100
ER	ERC	3100	374 00	4	**100-DR-1 Remediation**	Reduce worker risk, meet TPA	3.256			0.443	0.443
ER	ERC	3105	374.00	4	**100-BC-2 Assessment**	Reduce worker risk, meet TPA	1.001			0.000	0.000
ER	ERC	3700	374.00	4	**ERDF: Long-Term Disposal**	TPA / Protect river (support remediation of 100 area OU's), meet TPA, Operations & Transportation	1 646			8.600	8 600
WM	SW	2250-0	367 00	2	**TRUSAF Upgrad/Exten (W-319)**	Delays in WIPP opening require extended TRUSAF facility life for compliant storage of high gram TRU drums / If not funded, alternate storage facilities will have to be utilized.	0 000			1.555	1.555

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Cat.								($ in Millions)			
FT	Landlord	6680-12	363.50	2	D-391, 326 Fac Comp Renovation	FY 96 and 97: Brings building electrical and mechanical systems into compliance with current standard industrial codes and regulations. Ensures worker safety and facility reliability in support of Tri-Party Agreement activity.	0.036			0.000	0.000
FT	Landlord	6660	351.50	4	Infrastructure Transition Project	FY 97: Executive Order 12893 that requires federal agencies to include the private sector in investing in and managing infrastructure. Transitioning physical systems and services will allow resolution of safety issues, close gaps in critical services to mission activities and efficient/cost saving ownership and operation practices.	0.000			2.100	2.100
ER	ERC	3300	344.00	4	300-FF-5 Remediation	Reduce worker risk, meet TPA	0.000			0.000	0.000
WM	SW	2320-1	341.50	2	T Plant Vent Upgrde(C-077)	Provides essential improvement to the 221-T Canyon HVAC system ensuring regulatory compliance, rad protection for personnel, the public and the environment; improved fire protection, and improved temperature control /If not funded, this project will not address life safety code issues.	0.000			0.408	0.408
FT	TRP	6623	335.50	1	300 AREA Building Isolation/Demolition	Roof on south portion of 313 building can collapse. If isolation is not funded unacceptable safety hazard would remain, including potential for serious injury/death.	3.500			9.700	9.700
WM	SW	2340-0	330.50	2	Wet Decon Proces Facility (W-354)	Provide a new and full service decontamination facility to be operational in FY 2007, if current engineering studies supporting TPA milestone M-33-00-T04 indicate the need /If not funded, additional costs to upgrade the existing facility to current Bldg codes will be required.	0.000			2.000	2.000
WM	WMin	7332	315.00	4	Site Waste Minimization High Return-on-Investment Fund	Establishes a fund for waste minimization projects with less than one year return-on-investment. Significant waste reduction, improved worker safety, and cost savings will not be realized. Environmental risks will not be reduced.	0.000			1.000	1.000

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WM	TWRS	1210-0	306 00	1	BARRIERS	Provide the feasibility study, development, procurement, site modification, construction, installation, and performance testing of small scale sub-surface confinement system for SSTs Meet TPA and safety initiative milestones. Impact Delays TPA milestone M-45-07.	3 591			0 132	0 132
WM	TWRS	1210-0	306 00	5	TECH DEV / APP ENG - SST	Develop enhancements to the reference SST retrieval system in order to improve sluicing retrieval performance, reduce cost, and reduce tank leakage potential Establish a competitive "fly off" concept in order to evaluate alternate approaches to SST retrieval Impact Increases risk of succesfully accomplishing TPA M-45-04	0 000			2 145	2 145
WM	TWRS	1210-0	306 00	5	TECH DEV / APP ENG - DST	Develop analytical models to provide basis for predicting performance of waste retrieval equipment Impact None	0 178			0 102	0 102
FT	Landlord	6661-0	298 00	3	Railroad Track Maintenance	FY 97 Responsible for the repair and upkeep of the Hanford Rail System, currently consisting of 168 7 kilometers of active track and its contiguous right-of-way, 186 turnouts, and 142 crossings, maintained to Class III Federal Railroad Safety Standards	0 000			1 014	1 014
ER	ERC	3200	292 00	4	200-Area Common Assessment	Reduce worker risk, meet TPA	0.100			0 000	0 000
ER	ERC	3020	292 00	4	RCRA-183H Solar Basin	Reduce worker risk, meet TPA	1 100			0 000	0 000
ER	ERC	3210	292 00	4	200-PO-1 Assessment	Reduce worker risk, meet TPA	0 050			0 000	0 000
ER	ERC	3230	292 00	4	200-UP-2 Assessment	Reduce worker risk, meet TPA	0 500			0 000	0 000
ER	ERC	3230	292 00	4	200-UP-1 Assessment	Reduce worker risk, meet TPA	0 000			0 000	0 000
ER	ERC	3230	292 00	4	200-UP-2 Remediation	Reduce worker risk, meet TPA	0 500			1 912	1 912
FT	Adv Reac	6641	284 00	4	TRIGA FUEL DISPOSITION	Required to vacate 308 Building / S&M activities must continue beyond current planning	0 814			0 000	0 000

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Cat.								($ in Millions)			
WM	SW	2250-0	279.50	2	Advanced Disposal (W-174)	This activity provides for a new LLW Cat III permanent disposal facility that uses lined trenches and objects are stabilized with grout / Lack of funding impacts the cost effectiveness of LLW Cat 3 disposal	0.000			0.125	0.125
WM	PNL	8410	268	1	Safety Analysis Report (SAR) Development	Regulatory requirements for developing safety basis for facility operations. If not funded, work stoppages and/or delays and fines for non-compliance will result.	0.000			2.530	2.530
FT	Landlord	6661-0	247.00	3	200 Area Steam	FY 97. Operation and maintenance of the 200 Area powerhouse and related equipment.	0.000			12.052	12.052
FT	Landlord	6661-0	247.00	3	300 Area Steam	FY 97: Operation and maintenance of the 300 Area powerhouse and related equipment	0.000			6.742	6.742
WM	HEMP	7330	235.00		CENRTC - Upgrade Camis (Computer Auto. Map. Info. Sys.)	Supports Capital Equipment computer purchases. Failure to provide adequately track RCRA permit compliance requirements				0.000	0.000
WM	HEMP	7330	235.00		Tri-Party Milestone M-35	Provide funding for HLAN access cost, training and associated access cost for Ecology and EPA to access Hanford data bases per Tri-Party Agreement Databases, Access Mechanism, and Procedures (DOE/RL-93-69) Appendix F Document of the Hanford Federal Facilities Agreement and consent order.				0.303	0.303
WM	HEMP	7330	235.00		RCRA Permit Pipeline Mapping/Marking	Supports facility-wide mapping/marking activities required by Hanford Facility RCRA Permit Condition II U and II V supports letters of commitment between RL and Ecology. As described in the Dangerous Waste Regulations WAC 173-303-950, "Any violation of this chapter may be subject to the enforcement and penalty sanctions of chapter 70 105 RCW.				0.290	0.290
FT	Landlord	6665	220.00	2	Security Transition Project	FY 97. Construct the modifications to building 2721E, Patrol Headquarters - Central Alarm Facility, to accomodate the Hanford Emergency Alarm Dispatch system This project continues the Hanford security transition and will enable the cost savings of combining security and fire dispatch services.	0.000			0.450	0.450

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WM	HEMP	7330	215.00		TSD Permit Requirements	Any violation of this chapter (WAC 173-303-950) may be subject to the enforcement and penalty sanctions of chapter 70.105 RCW. Civil penalties include fines of up to $10K per day for each violation and potential criminal activites could be prosecuted as a class B or class C felony.	0.000			0.746	0.746
WM	Plan Int.	7250	211.50		Assess B/L Worker and Eco. Risks	Just When added to the already complete public health risk baseline will then be used to highlight site elements that pose greatest ES&H risk potential. Comparisons are then possible between risks by type which will enable decision makers with informed, repeatable, calculated risk data. Imp Ability for RL and HQ to address greatest ES&H risks will be impeded and regulators and stakeholders will continue to influence work without meaningful risk data to aid in the decision process	0.293			0.000	0.000
WM	Liquids	2330-0	190.00	4	340 Facility Upgrades	Supports Project W-302, 340 Facility Upgrade (FY97 Line Item). IMPACTS. Non-compliance with WAC/RCRA for tank systems secondary containment and leak detection requirements. Possible fines or shut-down causing closure of 300 Area facilities including Labs and delaying TWRS TPA milestones associated with core sampling and tank safety investigations	0.819			2.825	2.825
WM	An. Serv.	7110-0	167.00	2	TWAL Project (W-XXX) (99 LI)	Provides the capability to prepare samples and perform analyses on waste that contain both high levels of transuranic materials and waste that contain hazardous chemical constituents.	0.000			0.000	0.000
WM	Liquids	2300-0	156.00	4	300 A New Feed Definitions	Supports 300 Area TEDF expanded feed study and upgrade, sludge minimization, and office support facility IMPACT. Limits facility flexibility to expand support to cleanup mission and waste minimization efforts	0.000			3.688	3.688

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CP WM ER FT	Program Name	ADS Num.	PPG Score	Grmbly Int.	Workscope Title	Justification / Impacts	Target Case Funded	Decre. Case Funded	Target Case Funded	Planning Case Unfunded	Total Program Require
Cat.								($ In Millions)			
FT	Landlord	6670	155 50	2	CE--Shops/Bldgs	FY 96 Funded Buy-Out of Mobile Office Lease (1) -- General Purpose Facility FY 97 Unfunded -- obsolete shop equipment which supports several programs	0 676			0 086	0.086
WM	An Serv	7100-2	152 50	2	RAD Waste Lines (W-087) TPA M-32 (93 LI)	This project will replace the radioactive waste drain piping from the hot cells in 222 S to 219-S and provide a new transfer route from 219-S to the tank farms This project is required to support TPA Milestone M-32 and the Part B permit for the 222-S facility	5.716			6.007	6.007
FT	TRP	8624	141 00	4	PFP DEACTIVATION	This activity assesses the current state of the facility, identifies and negotiates material and equipment disposition requriemtnes and develops plans to deactivate facilities If not funded, will not be able to reduce plant costs and risks to personnel and the public	0 000			2 400	2.400
WM	SW	2250-0	140 00	2	LLW Handling Facility (W-247)	Provides for volume reduction and reclamation of solid LLW for the entire Hanford Site / Lack of funding will impact the cost effectiveness of LLW disposal	0 000			0 250	0.250
WM	PNL	8400	134 5	2	Refrigerant Replacement Program	Regulatory requirement to phase out the use of regulated refrigerants If not funded, fines may result from violations of environmental laws	0.000			0.297	0 297
FT	Landlord	6680-0	123 00	2	L-196, Hanford Infrastr. Fiber Optic Loop	FY 97. Updates communication systems to the site Will provide 911 backup Current communication system is obsolete and inadequate	0.000			1.900	1.900
FT	Landlord	6680-15	119 00	2	D-420, Bldg Utilities Replacement	FY 96 and 97. This project replaces severely corroded sanitary and process water piping in the 325 Building Existing water system cannot support analytical lab and hot cell activity Potable water does not meet OSHA standards Systems will continue to fail Analytical laboratory activity will be severely impacted due to lack of water	0.000			2 856	2 856

1997 FY97 Integrated Priority List FINAL

Decrement, Target, Planning

April 15,1995

Identifier			Prioritization				FY96	FY 1997			
CP WM ER FT Cat.	Program Name	ADS Num.	PPG Score	Grmbly Int.	Workscope Title	Justification / Impacts	Target Case Funded	Decre. Case Funded	Target Case Funded	Planning Case Unfunded	Total Program Require
								($ In Millions)			
WM	PNL	8400	116	4	**Legacy Waste & Facility Consolidation**	Provides for cleanout of PNL EM legacy wastes in the 300 Area and consolidation of old lab facilities into 324/325/327 Buildings. If not funded, creates long term ES&H risks, non-compliance with DOE Orders, and continued surv. and mtn costs.	0.000			4.550	4.550
WM	HEMP	7330	115.00		**TPA Integration Tactical Management Support**	Supports Tri-Party Agreement Milestone Managers. Failure to provide adequate support will result in missing TPA milestones which may assess stipulated penalties under the RCRA/CERCLA statutes, $5K the first week, $10K each week following.				0.285	0.285
WM	HEMP	7330	100 00		**Sitewide NEPA EIS**	Supports initiation of site-wide NEPA EIS as requried by 10 CFR 1021 330 (c) and DOE order 4320 1B (7)(i).				0.200	0.200
FT	Landlord	6665	98 00	6	**General Purpose Lands Management Project**	FY 97: 10CFR360, Washington State Noxious Weeds RCW 17 10, WAC 16-750 This project provides control and if necessary eradication of Noxious weeds on the Hanford Site not included with other programmatic activity. Noxious weeds must be controlled per federal, state and local regulations.	0.000			0.250	0.250
WM	Liquids	2330-0	88.00	4	**Misc Streams BAT Implementation**	Supports three proposed GPPs which it is anticipated will be required with the implementation of Best Management Practices . IMPACT: Without funding, the facilities where BMP establishes the need for upgrades will have to fund the upgrades within their own funding allocations	0 000			0.278	0.278
FT	Landlord	6665	60.00	3	**Integrated Voice Data Telecommunication System**	FY 97: Lump sum payment to complete the lease to own contract for the IVDTS This would save approx $200K in interest charges versus making the scheduled payment in Nov 1997 Also reduces the monthly line charge	0 000			12 451	12 451
WM	PNL	8400	48	2	**Stds/Req'ments Identif. Doc's (S/RIDS) & Rule Implementation**	DNFSB recommendation to assess compliance with all standards/regulations plus develop implementation plans for new rules. If not funded, audit findings may result	0.000			3 228	3.228

1997 FY97 Integrated Priority List FINAL

Decrement, Target, Planning

April 15,1995

Identifier			Prioritization				FY96	FY 1997			
CP WM ER FT Cat.	Program Name	ADS Num.	PPG Score	Grmbly Int.	Workscope Title	Justification / Impacts	Target Case Funded	Decre. Case Funded	Target Case Funded	Planning Case Unfunded	Total Program Require
								($ in Millions)			
WM	PNL	8400	43	3	SMS Implementation	Implements Hanford Site Management System If not funded, PNL will be out of compliance with RL policy directive RLIP 5000 5 and Site Management Plan.	0.000			0.524	0.524
WM	Liquids	2300-0	23.00	4	300 A TEDF Office Facility	Provides for permanent office facility for 300 Area TEDF Operations No office space is available in treatment building IMPACTS Hinder operations, increasing plant downtime and not support TPA Cost and Management Efficiency initiative.	0.000		.	0.172	0.172
WM	Plan. Int.	7250	uns.		Program LOE Support to RL-PID	Just. As required. Imp. Not available.	0.000			0.515	0.515
WM	ROM	7340-0			CENRTC	Provides for capital equipment funding				2.575	2.575
	EM					Programmatic Total	1329.5	956.3	1141.9	798.2	1941.5
	EM					DOE-RL Directed	105.2	95.7	95.7	4.0	99.7
	EM					Site Total	1434.7	1052.0	1237.7	802.2	2041.2

DATE: APRIL 12

SRS FY97 EM INTEGRATED PRIORITY LIST
[Excludes OTD (EW-40)]
DOE-SR FY97 Budget Submission

DNFSB	HQ Org	B&R	Group Cost	Cumulative Total
1 PU Solutions to Metal - F Area	EM-60	EW-70	0	1,155,064
2 Mark 31s to Metal - F Area	EM-60	EW-70	4,577	1,159,641
3 Pu Vault Materials Stabilization	EM-60	EW-70	10,597	1,170,238
4 Bagless Transfer - FB Line	EM-60	EW-70	400	1,170,638
5 Am/Cm Solutions	EM-60	EW-70	12,700	1,183,338
6 New Pu Vault	EM-60	EW-70	5,000	1,188,338
7 Existing HEU Solutions Stabilization	EM-60	EW-70	1,300	1,189,638
8 SNF Processing - F Canyon	EM-60	EW-70	7,112	1,196,750
9 Nuclear Facility S&M (Warm Standby)	EM-60	EW-70	7,600	1,204,350
10 D&CA Support	EM-60	EW-70	4,448	1,208,798
11 Pu-242 Solutions to Metal	EM-60	EW-70	4,235	1,213,033
12 Pu-239 & Np Solutions - H Area	EM-60	EW-70	5,471	1,218,504
13 Pu-239 Residues - H-Area	EM-60	EW-70	3,000	1,221,504
14 SNF Processing in H Canyon	EM-60	EW-70	4,100	1,225,604
15 247-F (Naval Fuel) Vault Start-Up	EM-60	EW-70	5,947	1,231,551
	DNFSB Total:		76,487	1,231,551

Regulatory, Negotiate/Best Business	HQ Org	B&R	Group Cost	Cumulative Total
1 Heavy Water Critical Processing & Drum Consolidation	EM-60	EW-70	3,500	1,235,051
2 Infrastructure Support Projects	EM-60	EW-70	25,060	1,260,111
3 Pu-238 Post Cassini/Hi Assay	EM-60	EW-70	2,400	1,262,511
4 FRR Incremental Processing	EM-60	EW-70	1,519	1,264,030
5 Plant Maintenance Support Projects	EM-60	EW-70	10,362	1,274,392
6 Spent Fuel - Interim/Dry Storage Activities	EM-30	EW-31	1,950	1,276,342
7 Tank Farm Services Upgrade and Waste Removal Projects- HLWM	EM-30	EW-31	8,203	1,284,545
8 D Area Life Extension - Powerhouse	EM-60	EW-70	16,300	1,300,845
9 Regulatory Required Mixed Waste Treatment Facilities	EM-60	EW-70	179	1,301,024
10 Upgrade Canyon Exhaust System, Line Item	EM-60	EW-70	1,060	1,302,084
11 Misc ER Rem. (Regulatory Commitments)	EM-40	EW-20	14,623	1,316,707
12 Regulatory and Order Compliance Activities (EW-31)	EM-30	EW-31	22,318	1,339,025
13 Plant Maintenance and Infrastructure Projects	EM-60	EW-70	47,448	1,386,473
14 Increased Solid Waste Storage	EM-30	EW-31	1,056	1,387,529
15 LAW Vault #2 Project	EM-30	EW-31	13,900	1,401,429
16 High Level Waste New Facility Planning - HLWM	EM-30	EW-31	4,500	1,405,929
17 HW/MW Vaults	EM-30	EW-31	1,500	1,407,429
18 HLW System Operation - Increased Attainment (Completes FY2015) - HLWM	EM-30	EW-31	45,000	1,452,429
19 Heavy Water Upgrading & Consolidation from Tanks	EM-60	EW-70	5,516	1,457,945
20 235-F and 247-F Transition, Deactivation & Compliance Actions	EM-60	EW-70	203	1,458,148
21 ER Low Priority Regulatory Commitments	EM-40	EW-20	23,757	1,481,905
22 Infrastructure Base Program Upgrade Projects	EM-60	EW-70	16,420	1,498,325
23 Plantwide Fire Protection - Suppression System	EM-60	EW-70	8,154	1,506,479
24 SR Analytical Services (DOE)	EM-40	EW-20	750	1,507,229
25 SR Emergency Management (DOE)	EM-40	EW-20	200	1,507,429

DATE: APRIL 12

SRS FY97 EM INTEGRATED PRIORITY LIST
[Excludes OTD (EW-40)]
DOE-SR FY97 Budget Submission

		HQ Org	B&R	Group Cost	Cumulative Total
26	Reactor Facility Deactivation	EM-60	EW-70	12,974	1,520,403
27	R Area D&D	EM-40	EW-20	5,896	1,526,299
28	Miscellaneous D&D Activities	EM-60	EW-70	8,082	1,534,381
29	Administrative Support System Upgrades (EW-31)	EM-30	EW-31	5,185	1,539,566
30	Administrative Support System Upgrades (EW-70)	EM-60	EW-70	575	1,540,141
			Regulatory, Negotiate/Best Business Total:	308,590	1,540,141
			Grand Total:	1,540,141	1,540,141

ROCKY FLATS OPERATIONS OFFICE
INTEGRATED PRIORITY LIST

ACTIVITY DESCRIPTION	PROGRAM	B&R	FUND TYPE	FY 1996 TARGET FUNDING ($K)	FY 1996 TARGET CUMULATIVE ($K)	FY 1997 TARGET FUNDING ($K)	FY 1997 TARGET CUMULATIVE ($K)
EW31 Program Direction/RFFO Support	WM	EW31	OE	12,969	12,969	8,080	8,080
EW70 Program Direction/RFFO Support	FT	EW70	OE	63,011	75,980	46,873	54,953
EW20 Program Direction/RFFO Support	ER	EW20	OE	9,607	85,587	8,646	63,599
LANL Technical Support	FT	EW70	OE	3,500	89,087	1,500	65,099
Analytical Method Development	WM	EW31	OE	950	90,037	1,225	66,324
Waste Characterization	WM	EW31	OE	3,300	93,337	3,730	70,054
Backlog Characterization	WM	EW31	OE	1,545	94,882	2,875	72,929
NDA Operations	WM	EW31	OE	6,800	101,682	6,349	79,278
Waste Minimization Program	WM	EW31	OE	1,145	102,827	1,443	80,721
Bldg. 664 Maintenance & Surveillance	WM	EW31	OE	2,250	105,077	2,000	82,721
Bldg. 374 Maintenance & Surveillance	WM	EW31	OE	5,000	110,077	3,785	86,506
Bldg. 774 Maintenance & Surveillance	WM	EW31	OE	2,098	112,175	1,800	88,306
H&S Capital Equipment	FT	35EW70	OE	1,000	113,175	980	89,286
Site support GPP	FT	39EW70	GPP	3,000	116,175	1,875	91,161
Underground Storage Tanks Line Item	FT	39EW70	LI	5,000	121,175	1,000	92,161
Underground Storage Tanks Line Item	FT	EW70	OE	120	121,295	250	92,411
CAPASU Line Item	FT	39EW70	LI	2,800	124,095	6,500	98,911
CAPASU Line Item(exp)	FT	EW70	OE	0	124,095	200	99,111
Plant Fire/Security Line Item	FT	39EW70	LI	9,560	133,655	8,600	107,711
Plant Fire/Security Line Item	FT	EW70	OE	0	133,655	500	108,211
Infrastructure Line Item	FT	39EW70	LI	2,940	136,595	2,550	110,761
Infrastructure Line Item	FT	EW70	LI	100	136,695	100	110,861
Bldg. 776/777 Maintenance & Surv.	FT	EW70	OE	15,146	151,841	14,900	125,761
WSRIC Program	FT	EW70	OE	5,500	157,341	5,500	131,261
BLDG. 771 Maintenance & Surveillance	FT	EW70	OE	22,000	179,341	21,000	152,261
BLDG. 371 Maintenance & Surveillance	FT	EW70	OE	27,794	207,135	25,347	177,608
B886 Maintenance & Surveillance	FT	EW70	OE	1,900	209,035	1,000	178,608
BLDG. 707 Maintenance & Surveillance	FT	EW70	OE	29,360	238,395	27,600	206,208
BLDG. 991 Maintenance & Surveillance	FT	EW70	OE	1,500	239,895	600	206,808
Nuclear Material Management	FT	EW70	OE	600	240,495	600	207,408
Electronic Maintenanace	FT	EW70	OE	13,600	254,095	12,900	220,308
Support Services	FT	EW70	OE	4,500	258,595	3,000	223,308
Analytical Services Maint. & Surv.	FT	EW70	OE	16,400	274,995	17,800	241,108
Site Support GPP - Expense	FT	EW70	OE	0	274,995	100	241,208
BLDG. 779 Maintenance & Surveillance	FT	EW70	OE	7,000	281,995	7,660	248,868
Air Permitting, Monitoring, Assessment	FT	EW70	OE	4,200	286,195	3,200	252,068
Water Permitting, Monitoring, Assess	FT	EW70	OE	7,400	293,595	4,100	256,168
Ecology & Watershed Management	FT	EW70	OE	2,600	296,195	1,100	257,268
Environmental Policy Implementation	FT	EW70	OE	1,700	297,895	1,700	258,968
Environmental Reporting	FT	EW70	OE	1,000	298,895	1,000	259,968
Nuclear Safety	FT	EW70	OE	5,000	303,895	5,000	264,968
H&S Programs	FT	EW70	OE	25,723	329,618	20,000	284,968
Asbestos Abatement	FT	EW70	OE	0	329,618	1,200	286,168
Health Physics/Environ Programs LI	FT	EW70	OE	80	329,698	0	286,168
BLDG 883 Maintenance & Surveillance	FT	EW70	OE	2,000	331,698	400	286,568
BLDG. 865 Maintenance & Surveillance	FT	EW70	OE	700	332,398	600	287,168
Sewage Treatment Plant Upgrade Line Item	WM	EW31	OE	353	332,751	280	287,448
Operations Support	FT	EW70	OE	700	333,451	0	287,448
On-Site Water Management	FT	EW70	OE	3,500	336,951	4,000	291,448
Air Monitoring Improvement Line Item	FT	EW70	OE	250	337,201	0	291,448
BLDG 444/447 Maintenance & Surveillance	FT	EW70	OE	2,900	340,101	600	292,048
Site Support Capital Equipment	FT	35EW70	OE	2,100	342,201	1,500	293,548
BLDG 460 Maintenance & Surveillance	FT	EW70	OE	2,000	344,201	0	293,548
BLDG. 371 Liquids Stabilization	FT	EW70	OE	8,300	352,501	10,000	303,548
BLDG. 771 Liquids Stabilization	FT	EW70	OE	13,500	366,001	12,000	315,548
Residue Elimination Project	FT	39EW70	LI	33,100	399,101	25,500	341,048
Residue Elimination Project	FT	EW70	OE	9,920	409,021	5,540	346,588
Residue Management	FT	EW70	OE	2,120	411,141	2,120	348,708
Residue Elimination Operations	FT	EW70	OE	16,500	427,641	24,160	372,868
Waste Storage Facility - Res Elim Proj.	WM	39EW31	GPP	2,000	429,641	2,000	374,868
SNM Consolidation	FT	EW70	OE	22,899	452,540	25,000	399,868
Stabilization & Closure Projects	FT	EW70	OE	5,200	457,740	5,800	405,668
Liquid Waste Operations	WM	EW31	OE	10,500	468,240	11,265	416,933
Radioactive Storage & Operations	WM	EW31	OE	15,960	484,200	14,250	431,183
ER PROGRAM MANAGEMENT SUPPORT	ER	EW20	OE	8,798	492,998	8,000	439,183
ER PROGRAM MANAGEMENT SUPPORT	ER			1,000	493,998	0	439,183
ER PROGRAM MANAGEMENT SUPPORT	ER			2,780	496,778	2,780	441,963
ER PROGRAM MANAGEMENT SUPPORT	ER			3,519	500,297	0	441,963

ROCKY FLATS OPERATIONS OFFICE
INTEGRATED PRIORITY LIST

ACTIVITY DESCRIPTION	PROGRAM	B&R	FUND TYPE	FY 1996 TARGET FUNDING ($K)	FY 1996 TARGET CUMULATIVE ($K)	FY 1997 TARGET FUNDING ($K)	FY 1997 TARGET CUMULATIVE ($K)
Non-Radioactive Storage & Operations	WM	EW31	CE	3,000	503,297	3,000	444,963
OU#2 903 PAD	ER	EW20	CE	7,228	510,525	10,041	455,004
HEUN Project	FT	EW70	CE	12,111	522,636	5,000	460,004
New Sanitary Landfill Line Item	WM	EW31	CE	290	522,926	0	460,004
ER OPERATIONS	ER	EW20	CE	8,277	531,203.	7,749	467,753
OU#1 881 HILLSIDE	ER	EW20	CE	217	531,420	0	467,753
OU#3 OFFSITE	ER	EW20	CE	764	532,184	301	468,054
Waste Processing	WM	EW31	CE	5,695	537,879	6,500	474,554
371 Baseline Liability Reduction Activities	FT	EW70	CE	11,000	548,879	11,000	485,554
Regulatory Requirements - Chemical Mgmt	FT	EW70	CE	1,900	550,779	1,900	487,454
OU#4 SOLAR PONDS	ER	EW20	CE	29,465	580,244	34,252	521,706
779 Baseline Liability Reduction Activities	FT	EW70	CE	500	580,744	0	521,706
Future Line Items	WM	EW31	CE	450	581,194	400	522,106
Future CTMP Line Item (FY97 Start)	WM	EW31	CE	0	581,194	800	522,906
MSSA/MSTF Line Item	FT	39EW70	LI	7,000	588,194	7,000	529,906
MSSA/MSTF Line Item	FT	EW70	CE	223	588,417	260	530,166
Low-Level Waste Management	WM	EW31	CE	1,500	589,917	1,500	531,666
Waste Regulatory Programs	WM	EW31	CE	13,145	603,062	13,652	545,318
TRU Waste Management	WM	EW31	CE	1,300	604,362	2,042	547,360
865 Baseline Liability Reduction Activities	FT	EW70	CE	500	604,862	1,000	548,360
OU#5 WOMAN CREEK	ER	EW20	CE	1,364	606,226	1,141	549,501
Bldg. 374 Treatment Facility Line Item	WM	39EW31	LI	3,900	610,126	10,000	559,501
Bldg. 374 Treatment Facility Line Item	WM	EW31	CE	650	610,776	1,275	560,776
OU#6 WALNUT CREEK	ER	EW20	CE	896	611,672	893	561,669
CTMP B776 Inmob of Misc. Waste Line Item	WM	39EW31	LI	1,000	612,672	1,500	563,169
CTMP B776 Immob of Misc. Waste Line Item	WM	EW31	CE	210	612,882	200	563,369
INTEGRATED TECHNICAL PROGRAMS	ER	EW20	CE	5,824	618,706	12,016	575,385
OU#11 WEST SPRAY FIELD	ER	EW20	CE	260	618,966	0	575,385
OU#7 LANDFILL	ER	EW20	CE	2,051	621,017	5,888	581,273
Waste Management Capital Equipment	WM	35EW31	CE	1,000	622,017	1,000	582,273
Waste Management Capital Equipment	WM	EW31	CE	850	622,867	1,056	583,329
INDUSTRIAL AREA OUs	ER	EW20	CE	2,884	625,751	14,987	598,316
OU#15 INSIDE BUILDING CLOSURES	ER	EW20	CE	260	626,011	0	598,316
Waste Shipping	WM	EW31	CE	3,418	629,429	9,523	607,839
Actinide Solutions GPP	FT	39EW70	GPP	500	629,929	0	607,839
991 Baseline Liability Reduction Activities	FT	EW70	CE	100	630,029	70	607,909
444/447 Baseline Liability Reduction Act.	FT	EW70	CE	1,000	631,029	0	607,909
Waste Certification	WM	EW31	CE	700	631,729	2,300	610,209
ER WASTE	ER	EW20	CE	1,460	633,189	1,460	611,669
DESIGN AND CONSTRUCTION	ER	EW20	CE	1,946	635,135	2,446	614,115
883 Baseline Liability Reduction Activities	FT	EW70	CE	1,000	636,135	0	614,115
460 Baseline Liability Reduction Activities	FT	EW70	CE	1,000	637,135	0	614,115
Solid Waste Operations GPP	WM	39EW31	GPP	1,000	638,135	1,000	615,115
Solid Waste Operations Capital Equipment	WM	35EW31	CE	1,000	639,135	1,000	616,115
ER Surveillance & Maintenance	ER			400	639,535	400	616,515
Dom & Fire Water Refurb (exp)	FT	EW70	CE	0	639,535	250	616,765
EW70 Program Direction/RFFO Support	FT	EW70	CE			8,000	624,765
Analytical Method Development	WM	EW31	CE			851	625,616
Waste Characterization	WM	EW31	CE			396	626,012
Backlog Characterization	WM	EW31	CE			2,390	628,402
Waste Minimization Program	WM	EW31	CE			144	'628,546
Bldg. 664 Maintenance & Surveillance	WM	EW31	CE			255	628,801
Bldg. 374 Maintenance & Surveillance	WM	EW31	CE			920	629,721
Bldg. 774 Maintenance & Surveillance	WM	EW31	CE			310	630,031
H&S Capital Equipment	FT	35EW70	CE			500	630,531
WSRIC Program	FT	EW70	CE			500	631,031
BLDG. 371 Maintenance & Surveillance	FT	EW70	CE			2,653	633,684
B886 Maintenance & Surveillance	FT	EW70	CE			500	634,184
Air Permitting, Monitoring, Assessment	FT	EW70	CE			1,000	635,184
Water Permitting, Monitoring, Assess	FT	EW70	CE			2,000	637,184
Ecology & Watershed Management	FT	EW70	CE			1,643	638,827
Environmental Policy Implementation	FT	EW70	CE			1,300	640,127
BLDG 883 Maintenance & Surveillance	FT	EW70	CE			400	640,527
Operations Support	FT	EW70	CE			700	641,227
Site Support Capital Equipment	FT	35EW70	CE			1,500	642,727
Stabilization & Closure Projects	FT	EW70	CE			1,000	643,727
Liquid Waste Operations	WM	EW31	CE			660	644,387

ROCKY FLATS OPERATIONS OFFICE
INTEGRATED PRIORITY LIST

ACTIVITY DESCRIPTION	PROGRAM	B&R	FUND TYPE	FY 1996 TARGET FUNDING ($K)	FY 1996 TARGET CUMULATIVE ($K)	FY 1997 TARGET FUNDING ($K)	FY 1997 TARGET CUMULATIVE ($K)
Radioactive Storage & Operations	WM	EW31	OE			405	644,792
ER PROGRAM MANAGEMENT SUPPORT	ER	EW20	OE			1,332	646,124
Non-Radioactive Storage & Operations	WM	EW31	OE			150	646,274
OU#2 903 PAD	ER	EW20	OE			300	646,574
ER OPERATIONS -	ER	EW20	OE			2,000	648,574
OU#1 881 HILLSIDE	ER	EW20	OE			1,022	649,596
Waste Processing	WM	EW31	OE			445	650,041
371 Baseline Liability Reduction Activities	FT	EW70	OE			1,000	651,041
D&D Plutonium Buildings	ER	EW20	OE			9,654	660,695
779 Baseline Liability Reduction Activities	FT	EW70	OE			500	661,195
Future Line Items	WM	EW31	OE			120	661,315
Waste Regulatory Programs	WM	EW31	OE			476	661,791
Bldg 374 Treatment Facility Line Item	WM	39EW31	LI			1,800	663,591
INTEGRATED TECHNICAL PROGRAMS	ER	EW20	OE			1,465	665,056
D&D Non-Plutonium Buildings	ER	EW20	OE			2,317	667,373
CTMP B374/774 Sludge Immob	WM	39EW31	LI			1,500	668,873
CTMP B374/774 Sludge Immob	WM	EW31	OE			210	669,083
Surface Organic Contam Removal	WM	39EW31	LI			2,500	671,583
Surface Organic Contam Removal	WM	EW31	OE			500	672,083
OU#7 LANDFILL	ER	EW20	OE			448	672,531
Waste Management Capital Equipment	WM	EW31	OE			60	672,591
INDUSTRIAL AREA OUs	ER	EW20	OE			5,090	677,681
D&D General Support Buildings	ER	EW20	OE			524	678,205
Waste Shipping	WM	EW31	OE			4,905	683,110
B707 Baseline Liability Reduction Act.	FT	EW70	OE			800	683,910
Waste Certification	WM	EW31	OE			634	684,544
Solid Waste Operations GPP	WM	39EW31	GPP			300	684,844
Solid Waste Operations GPP	WM	EW31	OE			100	684,944
National Conversion Pilot Project	FT	EW70	OE			16,500	701,444

TECHNOLOGY DEVELOPMENT

Mr. Myers. What activities are involved in the Domestic Technology Integration program?

Mr. Guimond. The Domestic Technology Integration program encompasses the following four activity areas:

1. Technology Decision Integration: (a) to implement a decision/performance based framework for technology that integrates programmatic, technical, financial, and stakeholder factors; (b) to implement a specific results-focused hierarchial decision process and information system that links technology development activities with the requirements of end-users; (c) to collaborate with Department of Defense to establish an Interagency Analysis Center to share technical data and leverage existing investments in technology across agencies.

2. Regulatory Reform: (a) to facilitate, through the Western Governors Association's DOIT (Develop On-site Innovative Technologies) Committee, an Interstate Technology Regulatory Cooperation that promotes sharing of information and acceptance of participating states' validation work on innovative technologies to expedite implementation; (b) to develop technology verification protocols for priority technology areas to accelerate regulatory approval of DOE applications; and (c) support Federal and multi-state regulators, technology developers and users in the implementation of streamlined/flexible regulatory approaches to support performance specified procurements.

3. Implementation Facilitation: (a) to procure from the private sector risk-reducing and cost-effective technologies by facilitating objective expert links between technology suppliers and DOE users; and (b) to incentivize the private sector to deliver advanced/improved technologies through performance specified procurements.

4. Tribal and Public Participation: to fully implement tribal and public involvement programs by providing final linkage of technology-oriented tribal and public involvement with existing site-oriented involvement programs for implementation through Site Specific Advisory Boards and Site Technology Coordination Groups.

TECHNOLOGY DEVELOPMENT

Mr. Myers. Please list the contractors, a brief description of their activities and the funding for each in fiscal years 1995, 1996 and proposed for 1997.

Admiral Guimond. I would like to insert for the record the following table which provides this information.

Technology Development Decision Unit
(Dollars in Thousands)

	FY 1995 Comparable Appropriation	FY 1996 Comparable Appropriation	FY 1997 Budget Request
TECHNOLOGY INTEGRATION - Domestic	$8,459	$17,027	$18,454
Albuquerque Operations Office o Technology Decision Integration	0	0	2,185
Los Alamos National Laboratory o Technology Decision Integration	560	350	0
Geotech o Technology Decision Integration	35	0	0
Sandia National Laboratory o Technology Decision Integration	192	1,825	0
Sandial National Laboratory - California o Implementation Facilitation	113	33	0
Subtotal, Albuquerque Operations Office	900	2,208	2,185
Chicago Operations Office o Technology Decision Integration	101	2,800	3,000
Brookhaven National Laboratory o Implementation Facilitation	250	550	0
Ames Laboratory o Technology Decision Integration	215	350	0
Subtotal, Chicago Operations Office	566	3,700	3,000
Idaho Operations Office o Regulatory Reform, Implementation Facilitation	1,100	600	4,219
Subtotal, Idaho Operations Office	1,100	600	4,219
Morgantown Energy Technology Center o Implementation Facilitation	2,400	4,730	1,800
Subtotal, Morgantown Energy Technology Center	2,400	4,730	1,800
Oak Ridge Operations Office o Technology Decision Integration	40	100	2,225
Martin Marietta Energy Systems o Implementation Facilitation	450	2,187	0
ORISE o Technology Decision Integration	100	0	0
Subtotal, Oak Ridge Operations Office	590	2,287	2,225
Rocky Flats Operations Office o Technology Decision Integration	0	175	840
Rocky Flats - KH o Technology Decision Integration, Regulatory Reform, Tribal and Public Participation	309	680	0
Subtotal, Rocky Flats	309	855	840

Technology Development Decision Unit
(Dollars in Thousands)

	FY 1995 Comparable Appropriation	FY 1996 Comparable Appropriation	FY 1997 Budget Request
Technology Integration - Domestic (continued)			
Richland Operations Office	40	0	275
o Technology Decision Integration			
Pacific Northwest Laboratory	55	0	0
o Technology Decision Integration			
Westinghouse Hanford Corporation	330	0	0
o Technology Decision Integration			
Subtotal, Richland Operations Office	425	0	275
Oakland Operations Office	802	200	100
o Implementation Facilitation			
Lawrence Berkley Laboratory	116	33	0
o Implementation Facilitation			
Lawrence Livermore National Laboratory	126	34	0
o Implementation Facilitation, Regulatory Reform			
Subtotal, Oakland Operations Office	1,044	267	100
Savannah River Operations Office	0	500	1,300
o Technology Decision Integration			
Subtotal, Savannah River Operations Office	0	500	1,300
Headquarters	1,125	1,880	2,510
o Technology Decision Integration, Regulatory Reform, Tribal and Public Participation			
Subtotal, Headquarters	1,125	1,880	2,510
Total, Technology Integration - Domestic	8,459	17,027	18,454

TECHNOLOGY DEVELOPMENT

Mr. Myers. Please provide the same information for the International Technology Integration program.

Admiral Guimond. The International Technology Integration program is comprised of three main areas:

1. Science and Technology Cooperations: We participate with foreign scientific communities (former Soviet Union/Russia, Central and Eastern Europe) in joint R&D/demonstration activities to gain access to environmental technologies, technical information, and scientific expertise that will accelerate EM's cleanup effort. These activities are performed through the Joint Coordinating Committee for Environmental Restoration and Waste Management, a Memorandum of Cooperation that we are establishing with the Argentine Nuclear Energy Agency, and an agreement between Environmental Management and the Institute for Ecology of Industrial Areas in Poland. In addition, activities are performed with numerous countries, including England, Japan, France, and Taiwan.

2. International Coordination: Environmental Management international activities are being integrated with other DOE programs and external entities to support international technology transfer and meet U.S. foreign policy objectives. These activities are performed through participation with agencies such as the International Atomic Energy Agency in Vienna, Nuclear Energy Agency, and North Atlantic Treaty Organization,

3. International Technology Transfer: We are developing a variety of mechanisms for the Technology Development Focus Area and Cross-cutting programs to identify, evaluate, and acquire foreign environmental technologies that have application at EM sites.

The table below, which I would like to insert for the record, provides International Technology Integration program funding information.

Technology Development Decision Unit
(Dollars in Thousands)

	FY 1995 Comparable Appropriation	FY 1996 Comparable Appropriation	FY 1997 Budget Request
Technology Integration - International	$4,437	$3,568	$3,293
Albuquerque Operations Office	100	100	100
o Science and Technology Cooperation			
Sandia National Laboratory	1,470	350	205
o International Technology Transfer			
Subtotal, Albuquerque Operations Office	1,570	450	305
Argonne National Laboratory	175	0	0
o International Technology Transfer			
Subtotal, Chicago Operations Office	175	0	0
Idaho Operations Office	50	0	0
o International Coordination			
Lockheed	150	70	90
o Science and Technology Cooperation			
Subtotal, Idaho Operations Office	200	70	90
Morgantown Energy Technology Center	0	0	1,000
o Science and Technology Cooperation			
Subtotal, Morgantown Energy Technology Center	0	0	1,000
Ohio Operations Office	35	0	0
o International Technology Transfer			
Mound	15		
o International Technology Transfer			
Subtotal, Ohio Operations Office	50	0	0
Oak Ridge Operations Office	650	455	170
o Science and Technology Cooperation, International Coordination			
Martin Marietta Energy Systems	0	260	0
o International Technology Transfer			
Subtotal, Oak Ridge Operations Office	650	715	170
Pittsburgh Energy Technology Center	401	200	450
o International Coordination			
Subtotal, Pittsburgh Energy Technology Center	401	200	450
Pacific Northwest Laboratory	210	195	115
o International Technology Transfer, International Coordination			
Westinghouse Hanford Corporation	100	100	200
o Science and Technology Cooperation			
Subtotal, Richland Operations Office	310	295	315

Technology Development Decision Unit
(Dollars in Thousands)

	FY 1995 Comparable Appropriation	FY 1996 Comparable Appropriation	FY 1997 Budget Request
Technology Integration - International (continued)			
Oakland Operations Office	0	0	425
o International Coordination			
Lawrence Berkley Laboratory	90	50	0
o Science and Technology Cooperation			
Lawrence Livermore National Laboratory	80	25	25
o International Technology Transfer			
Subtotal, Oakland Operations Office	170	75	450
Westinghouse-Savannah River Corporation	12	0	0
o Science and Technology Cooperation			
Subtotal, Savannah River Operations Office	12	0	0
Headquarters	899	1,763	513
o Science and Technology Cooperation, International Coordination			
Subtotal, Headquarters	899	1,763	513
Total, Technology Integration - International	**$4,437**	**$3,568**	**$3,293**

TECHNOLOGY DEVELOPMENT

Mr. Myers. Please describe the University Research Program in Robotics. What is the funding for this program in fiscal years 1995, 1996 and 1997?

Admiral Guimond. The University Robotics program is focused on applied robotics systems for solving the remote application needs in environmental management and is fully integrated into all areas of the parent Technology Development Robotics program. At the direction of Congress, this activity transferred to Environmental Management from Nuclear Energy in FY 1994. The institutions funded are the Universities of Florida, Tennessee, Texas, New Mexico, and Michigan. Historically, Congress has directed that this university robotics program be funded from Non-defense EM funds.

FUNDING PROFILE

($ in Thousands)

FY 1995	FY 1996	FY 1997
$4,000	$3,500	TBD

TECHNOLOGY DEVELOPMENT

Mr. Myers. What is the potential usefulness of the electrometallurgical process to dispose of spent fuel?

Admiral Guimond. DOE stores over 150 different types of spent fuels, many of them unique to DOE, at its weapons production sites and national laboratories. The Department's ability to dispose many of these fuels in a geologic repository without further processing is now being examined. Some of these fuels may not be suitable for direct disposal because they could pose a critical risk, are chemically reactive or prone to corrosion. A few DOE spent fuels may exhibit hazardous characteristics as defined under the Resource Conservation and Recovery Act (RCRA) and the regulations that implement it (40 CFR 261 *et seq.*). The preliminary repository waste acceptance criteria prohibit RCRA-hazardous or mixed wastes. Programmatic cost and scheduling issues must also be considered. Qualifying the wide variety of DOE spent fuels for repository disposal could be a very time consuming and expensive process. Reducing the volume of materials to be disposed would greatly reduce the Department's spent fuel cask purchasing costs and transportation.

Electrometallurgical processing may provide a relatively low cost means to convert a wide variety of spent fuels into a few common waste forms using the same basic process and facilities. The fuel is dissolved in molten salt and the constituents are separated by passing electric currents through the mixture. The result is a (1) mineral high-level waste, which is combined with borosilicate glass, (2) a metal alloy high-level waste form containing the structural materials, and (3) pure uranium. Many of the spent fuel characteristics, which may pose concerns for direct geologic disposal may be eliminated during electrometallurgical processing. Although more work needs to be done on the nature and long-term physical behavior of the resultant high-level waste forms the volume of these high-level wastes could be substantially less than the volume of the intact spent fuel, depending on the fuel type. The recovered uranium can be disposed as low-level waste or blended down to low enrichment for use in commercial power reactors or research reactors.

The electrometallurgical process is still being developed by the Argonne National Laboratory (ANL). The Department is proposing to demonstrate the process on spent fuel from the EBR-II reactor at the ANL-West facility in Idaho. An Environmental Assessment has been prepared in accordance with the procedural requirements National Environmental Policy Act (NEPA). However, there are a number of technical and programmatic issues and that must be resolved before any decision can be made on the use of the electrometallurgical treatment technology for other DOE spent fuels beyone the EBR-II fuels. See the response to the next question.

TECHNOLOGY DEVELOPMENT

Mr. Meyers. How practical will its application be to the wide variety of spent fuel in the DOE complex?

Admiral Guimond. At the present stage of development, the electrometallurgical treatment process appears to be a promising option for many DOE spent fuels but research would need to be completed to make this determination on a factual, less speculative basis. Several other treatment processes are also being developed for this purpose. The Department is proposing to demonstrate the electrometallurgical technology using spent fuel and blanket elements from the EBR-II reactor. An Environmental Assessment (EA) has been issued by DOE for public review. The demonstration would take place in a full-scale prototype electrorefiner at the Argonne National Laboratory - West (ANL-W) facility in Idaho.

There remain a number of open technical issues with the process. These issues were detailed in a recent National Academy of Sciences report on the technology's promise for immobilizing excess weapons plutonium. The suitability of the mineral and metallic high-level waste forms for repository disposal is the most critical technical issue. Complete characterization of the waste forms and subsequent qualification for their disposal in a geologic repository cannot be done until actual spent fuel has been processed. ANL believes that the high-level waste forms can be made to meet or exceed the repository performance of borosilicate glass.

There are also a number of programmatic issues to be resolved. The Department does not know for certain which fuels will be unsuitable for direct disposal, so the exact amount and types of fuel that could require processing are not known. Several years of development and demonstration will be required before the waste forms are fully characterized so that a determination about their suitability for repository disposal can be made. The fate of the highly enriched uranium recovered through electrometallurgical processing must be resolved. One proposal is to blend it to a low enrichment in the treatment process. At this point it is too early to say how practical a particular technology will eventually prove to be.

TECHNOLOGY DEVELOPMENT

Mr. Myers. Is EM funding any of this effort in fiscal year 1997?

Admiral Guimond. No. Although EM was directed by Congress in FY 1996 to provide $25M to Argonne National Laboratory West, all funding in FY 1997 is requested as part of the Office of Nuclear Energy request. Funding to the Argonne National Laboratory-West of $25 million in FY 1996 has been provided through the Environmental Management Technology Development Program (program is managed by the Office of Nuclear Energy, Science and Technology) and $25 million in FY 1997 through the Office of Nuclear Energy, Science and Technology.

TECHNOLOGY DEVELOPMENT

Mr. Myers. Please describe the proposal for using pentaborane for environmental remediation.

Mr. Guimond. The Office of Environmental Management evaluated the feasibility of using pentaborane in a waste treatment/chemical separation process as a starting material for the synthesis of cobalt dicarbollide, a Russian technology reagent used for Cesium/Strontium removal from nuclear wastes. The cobalt dicarbollide technology is being investigated for applications to U.S. wastes and has been successfully tested at the Idaho National Engineering Laboratory. The Idaho Chemical Processing Plant waste and other waste streams in the DOE complex will be the focus of the evaluation of pentaborane/cobalt dicarbollide as waste treatment feedstocks.

Environmental Management has provided $100,000 in FY 1996 for a feasibility study on the use of pentaborane and its derivative compounds for potential environmental management applications.

TECHNOLOGY DEVELOPMENT

Mr. Myers. How can you justify funding the National Conversion Pilot Project at Rocky Flats which last year was funded as an economic development project?

Admiral Guimond. The National Conversion Pilot Project (NCPP), funded through our Rocky Flats Field Office, will use fiscal year 1996 funding from both the Office of Environmental Management and Office of Worker and Community Transition. Environmental Management will provide a total of $5 million to conduct activities, including deactivation and decontamination, in the NCPP buildings, particularly Building 883 (A-side, Annex). Worker and Community Transition will provide a total of $5 million to conduct NCPP economic development activities, including equipment refurbishment and process verification. This teaming will allow the building to be cleaned up earlier and allow for an alternate use to recycle the contaminated materials to make containers to dispose of low-level wastes from Rocky Flats. Not funding the NCPP could substantially reduce DOE credibility, and therefore, effectiveness in the privatization arena; postpone reduction in surveillance and maintenance costs in the NCPP buildings; prevent reduction in health and safety risks of plant workers from exposure to beryllium and depleted uranium in the buildings; and may result in added disposal costs by requiring the purchase of new, uncontaminated disposal containers. The Department believes these activities are readily justifiable as part of our mandate to protect human health and the environment and to be good stewards of public funds by reducing costs. In fact, it would be difficult to conduct these activities.

For fiscal year 1997, the Office of Environmental Management has no funding identified for economic development activities, consistent with direction provided in the Energy and Water Development House Conference Report dated October 26, 1995.

TECHNOLOGY DEVELOPMENT

Mr. Myers. What relative priority does this project have in the integrated priority list for Rocky Flats?

Admiral Guimond. It is ranked in the top half of the priority list.

PROGRAM DIRECTION

Mr. Myers. By office, how many headquarters staff have at least 1 year of experience or 2 years of post-high school education in environmental science, studies, policy, or engineering prior to working for the Department?

Admiral Guimond. We do not keep these kind of statistics, however, we are collecting them and will have the data to you by May 13, 1996.

PROGRAM DIRECTION

Mr. Myers. How many of each civil service grade level are in each office?

Admiral Guimond. I would like to insert for the record the attached chart which reflects this information.

Headquarters Employees by Grade														
	GS-02	GS-04	GS-05	GS-06	GS-07	GS-08	GS-09	GS-11	GS-12	GS-13	GS-14	GS-15	SES	Other	TOTAL
Ofc of the AS	0	0	0	0	0	0	3	1	2	1	1	4	5	4	22
Ofc of Safety & Health	0	0	0	0	1	0	0	0	1	0	5	8	1	0	16
Ofc of Mgmt & Evaluation	2	1	0	1	9	1	9	5	3	21	20	11	1	0	84
Ofc of Planning, Policy & Budget	0	2	2	2	4	0	2	9	8	9	18	9	3	3	71
Ofc of Waste Mangement	0	0	0	0	9	4	2	4	1	19	47	39	4	0	129
Ofc of Environmental Restoration	0	0	3	0	10	5	3	4	1	23	48	29	6	0	132
Ofc of Science & Technology	0	0	0	2	5	3	3	3	0	3	29	17	5	0	70
Ofc of Nuclear Material & Facility Stabilization	0	0	0	2	11	2	4	0	3	5	32	27	5	0	90
Office of Site Operations	0	1	0	3	4	1	0	2	1	5	26	28	4	0	75
TLDP Interns	0	0	0	0	1	0	0	5	2	0	0	0	0	0	8
EM Interns	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4
TOTAL	2	4	5	10	55	16	26	33	26	86	226	172	33	7	701

Data as of February 1996

PROGRAM DIRECTION

Mr. Myers. What private companies with whom DOE has contracts are located in the same office building as DOE federal staff?

Admiral Guimond. The following chart reflects contractors with office space in Federal buildings.

DOE Contractors with Office Space in Federal Buildings						
Contractor	Total Employees	Forrestal	Clover-Leaf	Trevion	GTN Bldg	Function
Systems Flow, Inc	17	11	3	3	0	Mail Room
Coleman Research Corp.	15	11	4	0	0	Technical Support
Capstone	38	19	9	10	0	Secretarial Support
Booz Allen & Hamilton	3	0	3	0	0	Technical Support
APEX	5	4	1	0	0	Technical Support
EnviroTech,	1	0	1	0	0	Technical Support
Camber	1	0	1	0	0	Technical Support
ERC, Inc.	2	1	1	0	0	Technical Support
RMCI	3	0	3	0	0	Technical Support
Mele Associates	2	0	2	0	0	Technical Support
Argonne Nat. Lab	1	0	1	0	0	Technical Support
Lockheed	3	2	1	0	0	Technical Support
Sandia Nat. Lab	2	0	2	0	0	Technical Support
Oak Ridge Assoc. Univ.	1	0	1	0	0	Technical Support
Kaiser-Hill	2	1	1	0	0	Technical Support
Advance Systems Technology (AST)	1	1	0	0	0	Technical Support
ATL International	1	1	0	0	0	Techncial Support
CTAC	1	1	0	0	0	Technical Support

DOE Contractors with Office Space in Federal Buildings						
Contractor	Total Employees	Forrestal	Clover-Leaf	Trevion	GTN Bldg	Function
Digital Systems Research (DSR)	1	1	0	0	0	Technical Support
SAIC	9	9	0	0	0	Technical Support
Soza	1	1	0	0	0	Technical Support
Univ. Of California	1	1	0	0	0	Techncial Support
Urban Energy Corp.	1	1	0	0	0	Techncial Support
Waste Policy Inst.	1	1	0	0	0	Techncial Support
GemTech	5	0	0	0	5	Technical Support
Total	118	66	34	13	5	Technical Support

PROGRAM DIRECTION

Mr. Myers. For each individual Environmental Management program organization at headquarters and for each operations office, field office, area office, or site office which receives environmental management funding, please provide a list of all support service and technical assistance contractors including the name of the contractor, the cost of the contract, the associated full-time employees, and a brief description of the tasks performed (support for the program organization is not an acceptable answer). Provide this information for fiscal years 1995, 1996 and 1997.

Admiral Guimond. The following tables contain some of the contract information requested. Information for FY97 has not yet been developed. We will provide additional descriptive information by May 1, 1996. Please regard this as an interim reponse.

FISCAL YEAR 1995

Contract	Obligation	FTE*	Brief Description
ALBUQUEQUE			
Advanced Sciences	12,158,693	81 06	WIPP RTD Support Services
Applied Sciences Lab	100,000	0 67	Technical Support to the Office of Energy, Science, and Technology
New Mexico State University	20,000	013	Economic Impact Analysis of DOE & New Mexico Activities
Roy F Weston	200,000	1 33	Technical Support to the Office of Civilian Radioactive Waste
Scientech, Inc	1,590,500	10 60	Office of Administrative Support Services
Southwest Resource Development	96,000	0 64	Technical Management for ETD
Stone & Webster Engineering Corp.	648,000	4 32	Technical Support Services for WMOSD
NFT	475,000	3 17	Technical Support Services for TTCS
TOTAL:	**15,288,193**	**101.92**	
RICHLAND			
Advanced Sciences	334,000	2.23	RI/FS Work on 100-HR-1 Area
Basic Technology International Corp.	250,000	1.67	Environmental Workforce Study Task
Jacobs Engineering Group	2,850,000	19	Support Services for Competition
MAC Technologies Service	'32,421,097	216.14	Basic Contract for General Support Services
PAI Corp.	25,000	.16	Health Safety Environment & QA Oversight
R.J. Miranda & Co.	525,888	3 5	Cost Estimation of Environmental Restoration
TOTAL:	**36,405,985**	**242.70**	
FERNALD			
A-Plus Temps	255,536	1.70	Clerical Support
C.J. Health Records Consultant	225,048	1.5	Administrative Support Services
MAC Technologies Service	35,000	0.23	Technical Support to Vetification Facility Startup
Modern Technologies Corp.	2,000,000	23.33	Environmental Support Services for the Fernald Site Office
Procurement Automation	36,698	0.24	Computer Writing System for Contracts
TOTAL:	**2,552,982**	**17.02**	
IDADO			
Advanced Sciences	496,400	3.3 1	Res. & Assessment of WM Program & Technologies @ INEL
Ecology & Environment Inc.	1,118,900	7.46	Technical Support Services for the Nuclear Fuels Program
Environmental Science & Res. FTD	1,812,000	12.08	Environmental Surveillance monitoring & Radio & Wildlife Survey
ERM Program Management Co.	845,857	5 64	Risk & Performance Safety Assessment, Sampling & Analysis Fuel Transfer Consultants
Halliburton Nus Environmental Corp.	1,832,879	12.22	EIS Process, SNF Cost Evaluation
Idaho State University	26,076	0 17	TQM services. pecision ctr support and other services
Jason & Associates Corp	1,368,279	9 12	K. Basin EIS Support
Science Application International	3,757,065	25 05	Spent Nuclear Fuel Management Evaluation & SNF foriegn research reaction EIS
Scientech	661,495	4 41	Federal Facilities Compliance - Nuclear & Safety Support
TOTAL:	**11,918,951**	**79.46**	
CHICAGO			
[illegible]	[illegible]	1.49	Technical Support for the Chicago Operations Office

FISCAL YEAR 1995

Contract	Obligation	FTE*	Brief Description
SAVANNAH RIVER			
Halliburton	2,241,829	14.95	Technical Support NEPA Environmental Safety & Health & Quality Assurance
PRC Environmental Mgmt	5,100,687	34	Technical Support Services for the Asst. Manager for Environmental Management
Stone & Webster Engineering	2,225,000	14.83	Technical Support for High Level Waste
World Computer Systems	81,000	0.54	Administrative Report
TOTAL:	9,648,516	64.32	
OAK RIDGE			
PAI Corp	1,151,072	7.67	Technical Support MMES Waste Management
Science Application	79,000	.53	ADP Support
Associates Relocation Mgmt	428,419	2.85	Relocation Services
C.J. Health Records Consultant	15,150	.10	Administrative Support Services
Enterprise Advisory Services	731,700	4.88	Administrative Support
Systematic Mgmt. Service	698,998	4.66	Support for services for Oak Ridge Site Offices
TOTAL:	3,108,339	20.69	
NEVADA			
Computer Sciences Corp.	11,349	.08	Information Technical Resource Support
Gut-Palmenburg Inc.	12,377	.08	Waste Management
Nevada University	490,330	3.27	Environmental Safety & Health
PAI Corp.	1,311,578	8.74	Technical Support to AMESSH
TOTAL:	1,825,634	12.17	
ROCKY FLATS			
Aguirre Engineers	132,115	.88	Training development and technology support for Rocky Flats
Executive Forum	50,000	.33	Rocky Flats reorganization & realignment
Greenbar Corp.	50,000	.33	ADP Hardware & Software Maintenance
MH Chew & Associates	254,297	1.70	Technology support
Marshall Group	100,000	.67	Rocky Flats reorganization & realignment
Nuclear Filter Technology	32,000	.21	Support to Rocky Flats Chief Counsel
Parsons	1,000,000	6.67	Tech services in support of the site wide EIS Rocky Flats
Science Appli. International Corp.	1,360,394	9.06	Security & Material Control Tech. & Management Services
Sitex Environmental	113,767	.76	Abestos Management Oversight
Wackenhut Service	3,400,000	22.67	Security Services
Performance Development	37,909	.25	CED Technical Support
Swinerton & Walberg Co.	30,000	.20	Labor Mgmt. & Admin. Support
TOTAL:	6,560,482	43.73	

FISCAL YEAR 1995

Contract	Obligation	FTE*	Brief Description
SAN FRANCISCO			
Certified Environmental	350,000	2.33	Technical & Engineering Support
Ecology & Environmental	860,713	5.74	Environmental Engineering & Cost Support
Lee Associates	157,643	1.05	Mailroom, Record Center, Motor Pool Support
PAI Corp.	9,500	.06	ESQA Technical Support
Uribe & Associates	626,033	4.17	Technical Environmental Restoration Support
TOTAL:	2,003,889	13.36	
HEADQUARTERS			
Advanced Systems Tech., Inc.	342,928	2.29	
AES Corporation	47,500	0.32	Management Support Services to the Office of QA/QC Develop. & Oversight
APEX Technology, Inc.	200,000	1.33	Technical Support for the Office of Policy & Planning
ARINC Research Corp.	18,991	.013	Consulting and Admin. Support
BDM Corp	27, 475,000	183.17	Technical Support Services
Booz-Allen & Hamilton, Inc.	14,019,413	93.46	Technical Support Services for Waste Management
CADMUS	825,282	5.50	Technical Support Services for Office of Environ. Restoration
Camber Corp.	518,181	3.45	Technical Sup. Services for Remedial Action and Waste Technology
Capstone Corp.	4,838,841	32.26	Technical and Program Support for Planning and Resources
Coleman Research	25,678,107	171.19	Admin. and Clerical Support Services
Computer Data Systems	1,812,102	12.08	Technical and Program Support for Planning and Resource
Coopers & Lybrand	202,510	1.35	ADP & Telecommunications Support Services
Digital Systems Resources	2,042,423	13.62	Delivery TQM Implementation Services
Dyncorp	294,401	1.96	Technical & Management Support
Enterprises Advisory	24,569	0.16	Information Resources Management (IRM Support Service)
ERC	530,000	3.53	Administrative Support Services
Facilities Management Corp.	229,547	1.53	Specialized Technical & Admin. Support Services
GEM Technologies	2,000,000	13.33	Temporary Help Services
GRAM, Inc.	501,396	3.34	Technical Support for Safety & Security Management
Hazardous & Medical Waste Ser.	156,418	1.04	Technical Support Services
Henderson Associates	24,325	0.16	Technical & Admin. for Office of Environmental Oversight
International Develop. & Res. Inc.	1,500,000	10.0	Conduct Preparatory & Logistical Work for Tech. Training
Jason & Associates	361,194	2.41	Technical Support Services
Jupiter Corp	422,000	2.81	Technical Support Services
KIRA	200,000	1.33	Technical and Support Services
McAssociates	48,853	0.33	Technical and Admin. Support
MITRE	650,000	4.33	TQM Support Services
MELE	750,000	5.0	Engineering Research and Development Support Service
			Analytical Engineering & Admin. Support

FISCAL YEAR 1995

Contract	Obligation	FTE*	Brief Description
HEADQUARTERS (cont.)			
Parallex	1,000,000	6 67	Safety & Health Support for the Office of Safety & Health Oversight
Research Mgmt. Consultant, Inc.	150,000	1 0	Support Services for Energy Technology Visuals
Scientech, Inc.	960,000	6 4	Technical Analytical & Admin. Support
Seminar Specialist	24,783	0 17	Environ. Justice Stimulation Pilot Project
Sociotechnical Research Application	722,307	4 82	Technical Support to the Office of Quality Assurance
Sybase	199,130	1.33	ADP Professional Services
Systems Flow	1,104,543	7.36	Technical & Administrative Support
Waste Policy Institute	21,010,959	140.07	Technical Support Services
TOTAL:	**110,885,703**	**739.24**	
PITTSBURG			
Brunes & Roc	3,497,892	23.32	
International Basic Tech.	400,000	2.67	PETC operation maintenance & Program implementaton
TOTAL:	**3,897,892**	**25.99**	Western Environmental Technology Office
MORGANTOWN			
DN American	10,000	.07	
Energetics	2,287,544	15.25	ADP Support
K&M Engineering	155,838	1.04	Technical Support
TOTAL:	**2,453,382**	**16.36**	Engineering Support
GRAND TOTAL:	**209,614,198**	**1,397.39**	

FISCAL YEAR 96

Contractor	Obligation	FTE	Brief Description
AC05			
Enterprise Advisory Services	$519,328	3.5	Administrative Support
PAI Corporation	$10,832	0.07	Technical Support MMES Waste Management
Peer Consultants	$92,766	0.6	Support for WSSRAP Project Office
Pragmatics	$6,000	0.04	ADP Support
Science Application	$11,652	0.08	ADP Support
Systematic Mgmt Service	$254,300	1.7	Support Services for Oak Ridge Site Offices
TOTAL	$894,876	5.97	
AC08			
PAI Corporation	$177,200	1.2	Technical Support to AMESSH
TOTAL	$177,200	1.2	
AC34			
Aguirre Engineers	$704,557	4.7	Trng Development & Tech Support for Rocky Flats
Digital Equipment	$62,500	0.4	Document Recovery Project for Litigation
ENI, Inc.	$1,160,752	7.7	Administrative Support Services
Ernest & Associates	$6,530	0.04	Consultant Services
Executive Forum	$126,372	0.8	Reorganization and Alignment
Greenberg Corporation	$722,500	4.8	Hardware Software and Maintenance
MH Chew & Associates	$510,031	3.4	Technical Support
Inglewood Group	$74,642	0.5	Technical Support
Jasen Todd, Esq.	$3,225	0.02	Administrative Hearing Officer
Nuclear Filter Technology	$81,541	0.5	Technical Support for Chief Counsel
Parsons	$2,200,000	14.7	Site Wide EIS Rocky Flats
Science Application	$5,835,956	38.9	Security & Material Control Tech & Mgmt Services
Swinerton & Walberg Co.	$47,250	0.3	Support Services for Labor Management Agreement
TOTAL	$11,535,856	76.91	
AC03			
Certified Environmental	$4,468	0.03	Environmental Engineering and Restoration
Ecology & Environmental	$475,000	3.2	Environmental Engineering and Cost Support
PAI Corporation	$9,500	0.1	
TRESP Associates	$37,269	0.2	Change in Type of Business
Uribe & Associates	$542,911	3.6	Technical Sup Services for Environmental Restoration & Waste Mgmt
TOTAL	$1,069,148	7.13	

PROGRAM DIRECTION

Mr. Myers. How many contractor employees in the field are working on headquarters projects such as programmatic environmental impact statements, and what is the fiscal year 1995, 1996 and 1997 funding for headquarters support provided by the field?

Admiral Guimond. There are 170 contractor FTEs working on headquarters-related projects in the field. The funding associated with this headquarters support follows:

FY 1995	FY1996	FY 1997
$45M	$30M	$23M

PROGRAM DIRECTION

Mr. Myers. Breakdown each field office account by operations office, field office, area office, site office or support office for funding and FTEs.

Admiral Guimond. The attached chart shows funding and FTEs by Operations Office. The data is presented at the same level of detail as that particular office's budget request is made.

Environmental Management

Operations Office/Installation Table

Congressional Budget Request

($000)

($ in thousands)	FY 1997 Request	FTEs
Albuquerque		
AL Ops	32,853	62.0
Grand Junction Proj Off	50,607	24.0
Inhalation Tox Res Inst	961	0.0
Kansas City Plant	13,380	4.0
Los Alamos Nat'l Lab	124,867	21.0
Pantex Plant	20,122	7.0
Pinellas Plant	59,065	18.0
Sandia, CA	4,801	0.0
Sandia, NM	42,126	8.0
UMTRA - Surface	42,967	40.0
UMTRA - Gwater	7,800	0.0
Waste Isolat'n Pilot Plnt	172,216	63.0
Total, Albuquerque	**571,765**	**247.0**
Chicago		
Ames Lab	2,490	0.0
Argonne Nat'l Lab (East)	18,868	9.0
Argonne Nat'l Lab (West)	12,391	0.0
Brookhaven Nat'l Lab	26,380	7.0
Environ. Measurements Lab	3,000	52.0
CH Ops	20,054	34.0
FERMILAB	2,102	1.0
Princeton Plasma Ph Lab	7,130	1.0
Total, Chicago	**92,415**	**104.0**
Idaho	**503,217**	**259.0**
Morgantown Energy Tech Ctr.	**76,073**	**14.0**
Nevada	**81,931**	**60.0**
Oak Ridge		
K-25	118,038	17.0
OR Nat'l Lab	158,621	0.0
Oak Ridge Ops	77,166	0.0
Oak Ridge Reservation	52,879	106.0
Paducah GDP	34,310	1.0
Portsmouth GDP	60,837	1.0
Weldon	67,500	12.0
Y-12	55,760	0.0

Environmental Management

Operations Office/Installation Table

Congressional Budget Request

($000)

($ in thousands)	FY 1997 Request	FTEs
FUSRAP	83,079	19.0
Total, Oak Ridge	**708,190**	**156.0**
Oakland		
Lawrence Berkeley Lab	12,075	14.0
Lawrence Livermore NL	58,266	29.0
Oakland Ops	14,094	16.0
Stanford Linear Acceler Ctr	4,610	4.0
General Electric	105	0.3
General Atomics	3,600	1.5
U.C. Davis	4,563	3.2
Energy Tech Eng Ctr/SSFL	23,449	12.0
Total, Oakland	**120,762**	**80.0**
Ohio		
Battelle Columbus Lab	3,982	0.0
Fernald Envir Mgmt Project	266,170	62.0
Mound Plant	87,465	39.0
Ohio Field Office	34,934	104.0
Reactive Metals, Inc.	20,284	4.0
West Valley	123,601	26.0
Total, Ohio	**536,436**	**235.0**
Pittsuburgh Energy Tech. Cr.	**14,519**	**31.0**
Richland	**1,319,138**	**517.0**
Rocky Flats	**551,647**	**286.0**
Savannah River	**1,178,921**	**521.0**
Headquarters	**273,328**	**618.0**
Ur/Th Reimbursement	42,000	0.0
Contribution to D&D Fund	376,648	0.0
Technical Lead Dev Prog	4,230	0.0
Buyout Costs	8,104	0.0
SUBTOTAL, EM	**6,459,324.0**	**3,128.0**
Govt Contribution to D&D Fund	(376,648)	
Use of Prior Year Balances	(150,400)	

Environmental Management

Operations Office/Installation Table

Congressional Budget Request

($000)

($ in thousands)	FY 1997 Request		FTEs
D&D Fund Foreign Fees	(45,900)		
Savannah River Pension Fund	8,000		
TOTAL, EM	**5,894,376**		**3,128.0**

PROGRAM DIRECTION

Mr. Myers. How many employees are in each of the following offices, and what is the total cost of maintaining each office in FY 1997: EM Office of Safeguards and Security; EM Office of Environment, Safety and Health; and the EM Office of Quality Assurance and Management?

Admiral Guimond. The following chart displays the requested information.

FY 1997 Program Funding (in thousands)

Organization	FTEs	Program Direction Funding	Program Funding	Total Funding
Safeguards & Security [a]	6	$ 610	$1,757	$2,374
Environment, Safety & Health [b]	14	$1,627	$5,548	$7,175
Quality Assurance & Management [c]	1	$ 102	$ 182	$284

[a] Within the Office of Environmental Management, six FTEs from the Safeguards and Security were transferred to the Office of Nonproliferation and National Security in FY 1996. The remaining six FTEs are within the Office Of Nuclear Material and Facility Stabilization.

[b] Within the Office of Environmental Management, currently there are 16 FTEs on board in FY 1996. The FY 1997 FTE number is a projection based on the distribution of FY 1997 FTE targets.

[c] Within the Office of Environmental Management, Quality Assurance and Management functions are part of the Office of Environment, Safety & Health. Information provided for Quality Assurance and Management is included in the Environment , Safety & Health funding and FTE information

PROGRAM DIRECTION

Mr. Myers. Using your current and most detailed organization chart, note in each block of the FTEs and the program funded administered.

Admiral Guimond. The following table provides the requested information based on the latest EM organizational chart. EM has provided a breakdown of federal staff based on our current distribution of employees currently onboard. The FY 1997 Strategic Alignment Initiative allocation of 618 FTEs will be allocated among EM programs over the next few months.

Organizational Structure	FY 1997 Funding Administered	Current Onboard Count
EM-1 Assistant Secretary	$ 1,000	20
EM-4 Office of Safety & Health	4,386	17
EM-10 Management & Evaluation	$ 0 [a]	5
EM-12 Office of Admin Services	65	23
EM-13 Office of Training & Education	8,600	9
EM-14 Office of Information Management	10,000	15
EM-15 Office of Cost & Perform Analysis	1,000	20
EM-16 Office of Acquisition Management	3,979	10
Total Management and Evaluation	$29,030	119
EM-20 Planning, Policy, and Budget	$ 0 [a]	2
EM-22 Office of Intergvt and Public Accountability	11225	20
EM-23 Office of Budget	447,411 [b]	32
EM-24 Office of Strategic Planning & Analysis	7,000	15
Total Planning, Policy and budget	$465,636	69
EM-30 Waste Management	$ 189,846 [c]	9
EM-32 Office of Eastern Operations	608,981	14
EM-33 Office of Business Management	0 [a]	18
EM-34 Office of Central Operations	347,022	14
EM-35 Office of Planning & Analysis	0 [a]	21

[a] Cross-Cutting Activities.
[b] Includes funding for Program Direction Budget.
[c] Includes $185,000 in Privatization funding.
[d] Rocky Flats funding included in EM-45.
[e] Interns are located throughout the DOE complex but are counted against Headquarters for personnel purposes.

Organizational Structure	FY 1997 Funding Administered	Current Onboard Count
EM-36 Office of Western Operations	298,294	16
EM-37 Office of Technical Services	0 [a]	13
EM-38 Office of Hanford Operations	476,533	20
Total Waste Management	$1,920,676	125
EM-40 Environmental Restoration	$ 0 [a]	9
EM-42 Office of Eastern Area Programs	1,288,359	29
EM-43 Office of Program Integration	17,318	31
EM-44 Office of Northwestern Programs	315,122	22
EM-45 Office of Southwestern Area Programs	739,834 [d]	25
EM-46 Office of Special Projects	0 [a]	7
EM-47 Office of Program Initiatives	0 [a]	7
Total Environmental Restoration	$2,360,633	130
EM-50 Science & Technology	$ 0 [a]	10
EM-52 Office of Science & Risk Policy	52,136	5
EM-53 Office of Technology Systems	273,210	29
EM-54 Office of Technology Integration	30,561	26
Total Science & Technology	$355,907	70
EM-60 Nuclear Material & Facility Stabilization	$ 0 [a]	5
EM-62 Program Integration Office	2,394	20
EM-63 Savannah River Office	410,869	14
EM-64 Rocky Flats Office	0 [d]	12
EM-65 Northwestern/Oak Ridge/Chicago Office	317,528	15
EM-66 Nuclear Material Stabilization Office	16,000	7
EM-67 Spent Fuel Management Office	248,383	13
Total Nuclear Material & Facility Stablilization	$995,174	86
EM-70 Site Operations	$ 0 [a]	8
EM-72 Office of Site Integration	130,336	16
EM-73 Mound & Pinellas Project Office	146,530	8
EM-74 Office of Program Integration	9,704	7

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[a] Cross-Cutting Activities.

[b] Includes funding for Program Direction Budget.

[c] Includes $185,000 in Privatization funding.

[d] Rocky Flats funding included in EM-45.

[e] Interns are located throughout the DOE complex but are counted against Headquarters for personnel purposes.

Organizational Structure	FY 1997 Funding Administered	Current Onboard Count
EM-75 Office of Environmental & Regulatory Analysis	772	11
EM-76 Office of Trans, Emerg Mgnt, & Anlyt Services	19,496	21
EM-77 Office of Pollution Prevention	25,430	6
Total Site Operations	332,268	77
EM Interns	0 [e]	20
Use of Uncosted	(150,400)	
SR Pension Fund	(8,000)	
Deposit	376,648	
Foreign Fees	(45,900)	
Total Environmental Management	$5,878,376	696

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[a] Cross-Cutting Activities.

[b] Includes funding for Program Direction Budget.

[c] Includes $185,000 in Privatization funding.

[d] Rocky Flats funding included in EM-45.

[e] Interns are located throughout the DOE complex but are counted against Headquarters for personnel purposes.

ENVIRONMENTAL RESTORATION

Mr. Myers. Please describe the accelerated schedule for Rocky Flats cleanup.

Admiral Guimond. The draft Rocky Flats Cleanup Agreement, which was recently released for public review and comment, includes a vision of near-term and intermediate site condition and provides a regulatory framework for environmental restoration activities at the site. The draft agreement does not include schedules for site cleanup. Plans to implement this vision as it relates to all site activities currently are being developed in concert with regulators and other stakeholders. If approved, the implementation plan would significantly accelerate the cleanup at Rocky Flats, based on the schedule described in the 1995 Baseline Environmental Management Report. It also includes a goal of removal of plutonium from the site as soon as possible, targeted to begin no later than 2010 and completed by 2015.

Rocky Flats received $5.0 million in FY 1996 to accelerate excavation and treatment of contaminated soils at T3 and T4 trenches. This specific example demonstrates how accelerated cleanup activities can greatly reduce the risk to workers, public, and the environment by removing the source of groundwater plume contamination.

EXCERPTS FROM ROCKY FLATS CLEANUP AGREEMENT

> **Near-Term Site Condition:** The Near-Term Site Condition is the time period during which the following activities will be completed: consolidation, stabilization, and safe storage of plutonium, other special nuclear material, and transuranic wastes; storage in a retrievable and monitored manner, disposal, and some removal of low-level, low-level mixed and other wastes; and nearly all cleanup activities. It is the intent of the Agencies to accelerate Site activities to substantially achieve and complete risk reduction and cleanup during this period of time. Completion of activities in this period is anticipated to take about 8 to 15 years.
>
> **Intermediate Site Condition:** The Intermediate Site Condition is the period of time during which all plutonium, other special nuclear material, and transuranic wastes will be removed from the Site. By the end of this period, none of these materials, nor the buildings that contained them will remain. Also by the end of this period, all low-level, low-level mixed, hazardous, and solid wastes will have been shipped off-site, disposed, or stored in a retrievable and monitored manner to protect public health and the environment. Any remaining cleanup will be completed. Activities occurring during this period are anticipated to be completed about 12 to 20-25 years from now.

ENVIRONMENTAL RESTORATION

Mr. Myers. What funding levels are assumed to complete cleanup by 2015?

Admiral Guimond. The goals stated regarding the near-term and intermediate site condition are not enforceable and are a range of dates, rather than a specific end date. 2015 is a goal for removal of plutonium from the site. Achieving site cleanup and removal of plutonium by 2015 would require increased funding over current targets. The required funding is expected to be on the order of $600 million per year, although no scenarios have been developed specifically for that year.

ENVIRONMENTAL RESTORATION

Mr. Myers. Is this deadline funding constrained?

Admiral Guimond. No, the deadline is not solely budget constrained. Removal of plutonium from the site depends on availability of an alternative site, as well as funding for stabilization and packaging of the material.

Completion of other cleanup activities, such as environmental restoration, deactivation, and decommissioning are funding constrained. Completion of these activities by 2015 would require increased near-term funding above current targets.

ENVIRONMENTAL RESTORATION

Mr. Myers. The remedial action program for each site is the bulk of the funding, but it is difficult to determine what activities are included. For each environmental restoration site, provide a detailed breakout of the remedial action activities and include funding for fiscal years 1995, 1996, and 1997.

Admiral Guimond. I would like to provide the following information for the record.

DATE : 04/09/96

ENVIRONMENTAL RESTORATION
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PAGE 1

Albuquerque - Defense

ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST
.AL.						
.AL.				0	0	0
.AL				0	0	0
.FN.						
.FN.				0	0	0
.FN				0	0	0
.SF.						
.SF.				0	0	0
.SF				0	0	0
SUBTOTAL				0	0	0
D.AL.COMPLIANCE						
ALAL- 16- -	AL-DIRECT	ER Agreement in Principle, Stat	EW2010700	1,348	653	1,729
D.AL.COMPLIANCE				1,348	653	1,729
D.AL.D&D						
ALLA-1051- -	LANL	Program Management - Defense Pr	EW2010401	667	0	0
ALLA-1055- -	LANL	Decontamination and Decommissio	EW2010401	658	0	0
ALLA-1055- -	LANL	Decontamination and Decommissio	EW2010402	203	0	0
ALSA-1292- -	SANDIA-NM	SNL Engineering Reactor	EW2010401	95	0	102
ALLA-2107- -	LANL	Programmatic Management	EW2010401	1,724	0	0
ALLA-2136- -	LANL	Decommissioning of the Contamin	EW2010401	72	0	0
ALLA-2136- -	LANL	Decommissioning of the Contamin	EW2010402	23	0	0
ALLA-3001- -	LANL	Decontamination and Decommissio	EW2010401	1,618	0	0
ALLA-3001- -	LANL	Decontamination and Decommissio	EW2010402	1,958	5,800	5,500
D.AL.D&D				7,018	5,800	5,602
D.AL.EQUIP						
D.AL.EQUIP				0	0	0
D.AL.LANDLORD						
D.AL.LANDLORD				0	0	0
D.AL.ND&D						
ALAL- 17- -	AL-DIRECT	ER Program Support	EW2010101	0	607	227
ALAL- 17- -	AL-DIRECT	ER Program Support	EW2010301	-1,465	911	0
ALAL- 18- -	AL-DIRECT	ER Program Support	EW2010101	0	127	179
ALAL- 18- -	AL-DIRECT	ER Program Support	EW2010301	1,472	0	0
ALAL-1001- -	AL-DIRECT	South Valley Superfund Site Rem	EW2010102	1,973	985	379
ALKC-1022- -	KCP	Environmental Restoration Manag	EW2010201	1,651	187	0
ALKC-1022- -	KCP	Environmental Restoration Manag	EW2010202	-320	2,261	1,574
ALKC-1022- -	KCP	Environmental Restoration Manag	EW2010301	-166	12	0
ALKC-1024- -	KCP	Abandoned Indian Creek Outfall	EW2010202	-39	1	0
ALKC-1028- -	KCP	Department 26	EW2010202	0	11	39

Compliance Oversight

D&D

ENVIRONMENTAL RESTORATION
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ADS NUMBER		INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST
ALKC-1029-	-	KCP	Department 27 Inside	EW2010201	-10	8	0
ALKC-1029-	-	KCP	Department 27 Inside	EW2010202	0	11	35
ALKC-1032-	-	KCP	Miscellaneous Contaminated Site	EW2010201	-22	10	0
ALKC-1032-	-	KCP	Miscellaneous Contaminated Site	EW2010202	-8	39	0
ALKC-1034-	-	KCP	Miscellaneous PCB Sites	EW2010202	298	73	0
ALKC-1038-	-	KCP	Outfall 001 Raceway/Northeast A	EW2010201	-41	4	0
ALKC-1038-	-	KCP	Outfall 001 Raceway/Northeast A	EW2010202	-626	48	184
ALKC-1040-	-	KCP	Plating Building	EW2010202	265	3.517	423
ALKC-1042-	-	KCP	South Lagoon	EW2010201	107	0	96
ALKC-1042-	-	KCP	South Lagoon	EW2010202	0	0	15
ALKC-1044-	-	KCP	GW Treatment & Monitoring	EW2010202	591	2.148	994
ALKC-1046-	-	KCP	TCE Still Area	EW2010201	-8	0	0
ALKC-1046-	-	KCP	TCE Still Area	EW2010202	0	29	359
ALKC-1048-	-	KCP	Maintenance Vehicle Repair Shop	EW2010201	3	0	0
ALKC-1048-	-	KCP	Maintenance Vehicle Repair Shop	EW2010202	-1	28	1.537
ALLA-1049-	-	LANL	Canyons	EW2010301	235	0	0
ALKC-1052-	-	KCP	Remediation Technology Evaluati	EW2010201	-176	142	0
ALLA-1066-	-	LANL	NEPA Documentation for Disposal	EW2010301	-106	0	0
ALLA-1067-	-	LANL	RCRA Mixed Waste Disposal Facil	EW2010202	-653	0	0
ALLA-1071-	-	LANL	TA-0. 19. 26. 73. 74	EW2010301	1.123	0	0
ALLA-1078-	-	LANL	TA-1	EW2010301	-48	0	0
ALLA-1079-	-	LANL	TA-10. 31. 32. 45	EW2010301	-960	0	0
ALLA-1082-	-	LANL	TA-11. 13. 16. 24. 25. 28. 37	EW2010301	-267	0	0
ALLA-1085-	-	LANL	TA-12. 14. 67	EW2010301	29	0	0
ALLA-1086-	-	LANL	TA-15	EW2010301	355	0	0
ALLA-1093-	-	LANL	TA-18. 27. 65	EW2010301	92	0	0
ALLA-1098-	-	LANL	TA-2. 41	EW2010301	-197	0	0
ALLA-1100-	-	LANL	TA-20. 53. 72	EW2010301	-46	0	0
ALLA-1106-	-	LANL	TA-21	EW2010301	-874	0	0
ALLA-1111-	-	LANL	TA-6. 7. 22. 40. 58. 62	EW2010301	48	0	0
ALLA-1114-	-	LANL	TA-3. 59. 60. 61. 64	EW2010301	-565	0	0
ALLA-1122-	-	LANL	TA-33	EW2010301	-226	0	0
ALLA-1127-	-	LANL	TA-35 Waste Oil Storage Pit. et	EW2010202	22	0	0
ALLA-1129-	-	LANL	TA-4. 5. 35. 42. 48. 52. 55. 63	EW2010301	636	0	0
ALLA-1130-	-	LANL	TA-36. 68. 71	EW2010301	-11	0	0
ALLA-1132-	-	LANL	TA-39	EW2010301	373	0	0
ALLA-1136-	-	LANL	TA-43	EW2010301	1	0	0
ALLA-1140-	-	LANL	TA-46	EW2010301	-552	0	0
ALLA-1144-	-	LANL	TA-49	EW2010301	108	0	0
ALLA-1147-	-	LANL	TA-50	EW2010301	-1.968	0	0
ALLA-1148-	-	LANL	TA-51. 54	EW2010301	-75	0	0
ALLA-1154-	-	LANL	TA-57	EW2010301	-181	0	0
ALLA-1157-	-	LANL	TA-8.-9.-23.-69	EW2010301	-298	0	0
ALPX-1198-AR-		PANTEX	Miscellaneous Chemical Spill Si	EW2010201	-184	6	81
ALPX-1198-AR-		PANTEX	Miscellaneous Chemical Spill Si	EW2010204	389	0	259
ALPX-1200-AR-		PANTEX	Landfills Assessment and Remedi	EW2010201	2.564	364	96

ENVIRONMENTAL RESTORATION
CUSTOMIZED REPORT
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ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST
ALPX-1200-AR-	PANTEX	Landfills Assessment and Remedi	EW2010202	0	0	1,048
ALPX-1200-AR-	PANTEX	Landfills Assessment and Remedi	EW2010204	0	1,454	673
ALPX-1203-AR-	PANTEX	Fire Training Area Burn Pits As	EW2010201	188	0	0
ALPX-1203 AR-	PANTEX	Fire Training Area Burn Pits As	EW2010204	851	0	0
ALPX-1205-AR-	PANTEX	Firing Sites Assessment/Remedia	EW2010201	1,507	35	113
ALPX-1205-AR-	PANTEX	Firing Sites Assessment/Remedia	EW2010204	5	1,048	0
ALPX-1207-AR-	PANTEX	Former Cooling Tower Assessment	EW2010201	-1	7	0
ALPX-1207-AR-	PANTEX	Former Cooling Tower Assessment	EW2010204	0	24	0
ALPX-1212-AR-	PANTEX	Miscellaneous/Rad Sites Assess	EW2010201	3,370	0	45
ALPX-1212-AR-	PANTEX	Miscellaneous/Rad. Sites Assess	EW2010204	60	218	105
ALPX-1213- -	PANTEX	Hypalon Pond Assessment and Rem	EW2010201	-13	0	0
ALPX-1213-AR-	PANTEX	Hypalon Pond	EW2010202	2	0	0
ALPX-1216-AR-	PANTEX	Ditches and Playas Assessment/R	EW2010201	517	133	44
ALPX-1216-AR-	PANTEX	Ditches and Playas Assessment/R	EW2010204	60	760	0
ALPX-1219-AR-	PANTEX	High Priority Release Sites Ass	EW2010201	39	1	0
ALPX-1219-AR-	PANTEX	High Priority Release Sites Ass	EW2010204	306	0	0
ALPX-1220-AR-	PANTEX	Old Sewage Treatment Plant Asse	EW2010201	-19	0	0
ALPX-1222-AR-	PANTEX	Supplemental Verification Sites	EW2010201	-145	45	0
ALPX-1222-AR-	PANTEX	Supplemental Verification Sites	EW2010204	0	31	0
ALPX-1223-AR-	PANTEX	Former Leaking Underground Stor	EW2010201	-119	8	0
ALPX-1223-AR-	PANTEX	Former Leaking Underground Stor	EW2010204	0	24	0
ALPX-1227-AR-	PANTEX	Undergrd Stor Tank At Othr Loc	EW2010201	57	0	9
ALPX-1227-AR-	PANTEX	Undergrd Stor Tank At Othr Loc	EW2010204	5	30	0
ALPX-1229- -	PANTEX	ER Program Management	EW2010201	1,661	0	0
ALPX-1229- -	PANTEX	ER Program Management	EW2010204	3,154	0	0
ALPX-1229-AR-	PANTEX	ER Program Management	EW2010201	0	814	2,363
ALPX-1229-AR-	PANTEX	ER Program Management	EW2010204	0	2,295	0
ALPX-1230-AR-	PANTEX	Zone 12 Groundwater Assessment/	EW2010102	0	0	1,000
ALPX-1230-AR-	PANTEX	Zone 12 Groundwater Assessment/	EW2010201	2,799	1,014	3,084
ALPX-1230-AR-	PANTEX	Zone 12 Groundwater Assessment/	EW2010202	0	0	155
ALPX-1230-AR-	PANTEX	Zone 12 Groundwater Assessment/	EW2010204	3,584	4,149	0
ALPX-1232-AR-	PANTEX	Burning Ground Assessment/Remed	EW2010201	118	335	0
ALPX-1232-AR-	PANTEX	Burning Ground Assessment/Remed	EW2010204	0	37	0
ALPX-1235-AR-	PANTEX	HYDROGEOLOGIC INVESTIGATIONS	EW2010201	-2	0	0
ALSA-1267- -	SANDIA-NM	Chemical Waste Landfill	EW2010201	621	451	636
ALSA-1267- -	SANDIA-NM	Chemical Waste Landfill	EW2010202	0	1,051	0
ALSA-1281- -	SANDIA-NM	Kauai Test Facility	EW2010101	-166	0	0
ALSA-1285- -	SANDIA-NM	Technical Support	EW2010201	3,551	1,284	2,140
ALSA-1285- -	SANDIA-NM	Technical Support	EW2010202	0	2,996	0
ALSA-1289- -	SANDIA-NM	Mixed Waste Landfill	EW2010201	1,310	208	713
ALSA-1289- -	SANDIA-NM	Mixed Waste Landfill	EW2010202	0	486	0
ALSA-1295- -	SANDIA-NM	Septic Tanks and Drainfields	EW2010201	2,403	227	392
ALSA-1295- -	SANDIA-NM	Septic Tanks and Drainfields	EW2010202	0	529	0
ALSA-1300- -	SANDIA-NM	Leaking USTs	EW2010201	-152	0	0
ALSA-1302- -	SANDIA-NM	Tech Area 1	EW2010201	2,820	739	3,434
ALSA-1302- -	SANDIA-NM	Tech Area 1	EW2010202	0	1,726	0

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ALSA-1303	SANDIA NM	Tech Area II	EW2010201	980	936	250
ALSA-1303-	SANDIA NM	Tech Area II	EW2010202	0	2.166	0
ALSA-1306-	SANDIA NM	Tech Areas III and V	EW2010201	2 987	522	306
ALSA 1306-	SANDIA NM	Tech Areas III and V	EW2010202	0	1 237	0
ALSA-1307-	SANDIA NM	Liquid Waste Disposal System	EW2010201	229	9	0
ALSA-1307-	SANDIA NM	Liquid Waste Disposal System	EW2010202	0	22	0
ALSA-1309-	SANDIA NM	Tijeras Arroyo	EW2010201	660	195	98
ALSA-1309-	SANDIA NM	Tijeras Arroyo	EW2010202	0	456	0
ALSA-1326-	SANDIA NM	RA Program Management	EW2010201	4.548	608	1.918
ALSA-1326-	SANDIA NM	RA Program Management	EW2010202	0	1.579	0
ALSA-1326-	SANDIA NM	RA Program Management	EW2010301	110	0	0
ALSA-1330-	SANDIA NM	Site-Wide Characterization	EW2010201	3 878	1.956	0
ALSA-1332-	SANDIA NM	Foothills Test Area	EW2010201	1.183	276	914
ALSA-1332-	SANDIA-NM	Foothills Test Area	EW2010202	0	645	81
ALSA-1333-	SANDIA NM	Canyons Test Area	EW2010201	570	116	350
ALSA-1333-	SANDIA NM	Canyons Test Area	EW2010202	0	269	0
ALSA 1334-	SANDIA NM	Central Coyote Test Area	EW2010201	544	524	174
ALSA 1334-	SANDIA NM	Central Coyote Test Area	EW2010202	0	1.222	0
ALSA-1335-	SANDIA NM	SW Test Area	EW2010201	1.314	133	50
ALSA-1335-	SANDIA-NM	SW Test Area	EW2010202	0	311	0
ALSA-1336-	SANDIA NM	Salton Sea Test Base	EW2010101	51	0	0
ALSA-1337-	SANDIA NM	Offsite Areas	EW2010101	154	72	0
ALSA-1338-	SANDIA NM	Tonopah Test Range	EW2010101	-30	0	0
ALSA-1345-	SANDIA NM	Corrective Action Management Un	EW2010202	427	2.267	3.398
ALSL-1350	SANDIA-CA	Remediation Program Management/	EW2010302	1.327	636	721
ALSL-1351	SANDIA CA	Fuel Oil Spill Assessment/Remed	EW2010302	1.565	1 448	1.363
ALSL-1352-	SANDIA-CA	Navy Landfill Assessment/Remedi	EW2010301	112	0	0
ALSL-1352	SANDIA-CA	Navy Landfill Assessment/Remedi	EW2010302	0	422	11
ALSL-1354-	SANDIA-CA	Compliance Monitoring	EW2010302	0	295	483
ALLA-2001-	LANL	Field Unit 1	EW2010301	11.750	3.360	1.700
ALLA 2001	LANL	Field Unit 1	EW2010302	2.669	7.840	8.300
ALLA 2002-	LANL	Field Unit 2	EW2010301	8.100	1 620	300
ALLA-2002-	LANL	Field Unit 2	EW2010302	145	3.780	5.400
ALLA-2002-	LANL	Field Unit 2	EW2010304	51	0	0
ALLA-2003-	LANL	Field Unit 3	EW2010301	3.200	1.170	900
ALLA-2003-	LANL	Field Unit 3	EW2010302	0	2.730	3 700
ALLA-2004-	LANL	Field Unit 4	EW2010301	5.521	1.860	1 400
ALLA 2004-	LANL	Field Unit 4	EW2010302	0	4.340	4.100
ALLA-2005-	LANL	Field Unit 5	EW2010301	4.800	1.530	2.000
ALLA 2005-	LANL	Field Unit 5	EW2010302	650	3.570	3.700
ALLA 2005	LANL	Field Unit 5	EW2010304	2	0	0
ALLA-2006-	LANL	Closures	EW2010202	1.064	0	0
ALLA 2006-	LANL	Closures	EW2010302	0	3.650	4.000
ALLA 2010-	LANL	Mixed Waste Disposal Facility (	EW2010202	6.406	0	0
ALLA 2010	LANL	Mixed Waste Disposal Facility (	EW2010301	250	0	0
ALLA 2010-	LANL	Mixed Waste Disposal Facility (	EW2010302	0	250	0

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ALLA-2105- -	LANL	Programmatic Technical Support	EW2010301	15.762	1.400	500	
ALLA-2105- -	LANL	Programmatic Technical Support	EW2010302	0	600	1.300	
ALLA-2107- -	LANL	Programmatic Management	EW2010301	19.625	8.921	493	
ALLA-2107- -	LANL	Programmatic Management	EW2010302	0	7.000	5.191	
ALLA-2110- -	LANL	Environmental Analytical Chemis	EW2010301	472	0	0	
D.AL.ND&D				131.089	105.631	75.532	Remedial Action
D.AL.PROG DIR							
D.AL.PROG DIR				0	0	0	
D.AL				139.455	112.084	82.863	
Chicago - Defense							
D.CH.D&D							
CH-1437- -	ANL-EAST	Reactor Facilities D&D Projects	EW2010402	0	1.063	0	
CH-8204- -	CH-DIRECT	Site A/Plot M - Surveillance an	EW2010401	213	170	170	
D.CH.D&D				213	1.233	170	D&D.
D.CH.ND&D							
CH-5201- -	AMES LAB	UST Contamination Assessment/Re	EW2010101	1	0	0	
CH-5202- -	AMES LAB	Ames Chemical Disposal Site (AC	EW2010101	1	0	0	
CH-5202- -	AMES LAB	Ames Chemical Disposal Site (AC	EW2010302	0	0	150	
CH-5202-AM-	CH-DIRECT	Chemical Disposal Site - Ames	EW2010102	106	0	0	
CH-5202-AM-	CH-DIRECT	Chemical Disposal Site - Ames	EW2010304	585	230	0	
CH-5203- -	AMES LAB	Program Management	EW2010101	3	0	45	
CH-5203- -	AMES LAB	Program Management	EW2010301	0	20	5	
CHAL-7200-PM-	CH-DIRECT	Geotech	EW2010301	-18	0	0	
CH-8200- -	CH-DIRECT	Chicago Prog. Mgmt Support	EW2010301	0	0	433	
CH-8201- -	CH-DIRECT	Agreements in Principle/IAG	EW2010301	0	0	300	
CH-8207- -	CH-DIRECT	Site A/Plot M Remediation	EW2010301	2.029	0	0	
D.CH.ND&D				2.707	250	933	Remedial Action
D.CH.PROG DIR							
D.CH.PROG DIR				0	0	0	
D.CH				2.920	1.483	1.103	
D.FN.CONSTRUCT							
D.FN.CONSTRUCT				0	0	0	
D.FN.D&D							
D.FN.D&D				0	0	0	
D.FN.EQUIP							
D.FN.EQUIP				0	0	0	
D.FN.LANDLORD							
D.FN.LANDLORD				0	0	0	

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D.FN.ND&D						
D.FN.ND&D				0	0	0
D.FN.PROG DIR						
D.FN.PROG DIR				0	0	0
D.FN				0	0	0
D.HQ.CONSTRUCT						
D.HQ.CONSTRUCT				0	0	0
D.HQ.D&D						
D.HQ.D&D				0	0	0
D.HQ.EQUIP						
D.HQ.EQUIP				0	0	0
D.HQ.ND&D						
HQ-100-AA-	HEADQUARTERS	Technical Support Environmental	EW2010301	49.401	12.228	807
HQ-2406-19-	HEADQUARTERS	Maxey Flats Disposal Site	EW2010301	0	8.000	8.000
HQ-9999-01-	HEADQUARTERS	D&D Fund Offset	EW2010301	133.700	350.000	376.648
D.HQ.ND&D				183.101	370.228	385.455
D.HQ.PROG DIR						
D.HQ.PROG DIR				0	0	0
D.HQ				183.101	370.228	385.455
D.ID.COMPLIANCE						
ID- 112-01-	INEL	Program Management Support	EW2010700	0	1.900	2.360
ID- 112-E1-	INEL	Program Management Support	EW2010700	1.335	0	0
ID- 112-E2-	INEL	Shoshone - Bannock Grant	EW2010700	300	0	0
D.ID.COMPLIANCE				1.635	1.900	2.360
D.ID.D&D						
ID- 46-EG-	INEL	ARVFS NaK - Army Reentry Vehicl	EW2010402	1.706	0	0
ID- 48-EG-	INEL	ARA II - Auxiliary Reactor Area	EW2010402	833	0	0
ID- 49 EG-	INEL	ARA III - Auxiliary Reactor Are	EW2010402	218	0	0
ID- 51-EG-	INEL	TAN - TSF D&D	EW2010401	32	0	0
ID- 52-EG-	INEL	ARA I - Auxiliary Reactor Area	EW2010402	216	0	0
ID- 52-EG-	INEL	ARA I - Auxiliary Reactor Area	EW2010404	276	0	0
ID- 53-EG-	INEL	TAN 607 Decon Shop D&D	EW2010402	17	0	0
ID- 54-EG-	INEL	MTR - Materials Test Reactor D&	EW2010402	30	0	0
ID- 58-01-	INEL	Facility D&D	EW2010401	0	144	550
ID- 58-01-	INEL	Facility D&D	EW2010402	0	4.408	5.363
ID- 58-01-	INEL	Facility D&D	EW2010404	0	124	0
ID- 58 EG-	INEL	CFA - 669/Hot Laundry D&D	EW2010402	76	0	0
ID- 60-EG-	INEL	ETR - Engineering Test Reactor	EW2010401	221	0	0

Headquarters - Defense

Remedial Action

Idaho - Defense

Compliance Oversight

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ID- 60-EG-	INEL	ETR - Engineering Test Reactor	EW2010402	25	0	0	
ID- 63-EG-	INEL	Borax-V D&D	EW2010402	74	0	0	
ID- 65-EG-	INEL	LOFT Ancillaries D&D	EW2010402	11	0	0	
ID-1305-WN-	INEL	SFE-20/CPP-740 D&D	EW2010401	27	0	0	
ID-1306-WN-	INEL	CPP-631. -709. -734 D&D	EW2010401	68	0	0	
ID-1307-WN-	INEL	CPP-640 D&D	EW2010401	21	0	0	
ID-1308-WN-	INEL	CPP-601 D&D	EW2010401	24	0	0	
ID-1309-WN-	INEL	Waste Calcine Facility D&D	EW2010401	22	0	0	
D.ID.D&D				3.897	4.676	5.913	D & D
D.ID.ND&D							
ID- 28-EG-	INEL	WAG 1 TAN - Test Area North Ass	EW2010101	1.005	1.214	795	
ID- 28-EG-	INEL	WAG 1 TAN - Test Area North Ass	EW2010102	104	4.233	5.482	
ID- 28-EG-	INEL	WAG 1 TAN - Test Area North Ass	EW2010104	6.245	209	0	
ID- 30-EG-	INEL	WAG 2 TRA - Test Reactor Area A	EW2010101	672	734	563	
ID- 30-EG-	INEL	WAG 2 TRA - Test Reactor Area A	EW2010102	256	275	283	
ID- 34-EG-	INEL	WAG 4/CFA - Central Facilities	EW2010101	1.226	612	837	
ID- 34-EG-	INEL	WAG 4/CFA - Central Facilities	EW2010102	-850	1.199	5.130	
ID- 34-EG-	INEL	WAG 4/CFA - Central Facilities	EW2010104	1.681	624	0	
ID- 36-EG-	INEL	WAG 5 - PBF & ARA Assessment/Cl	EW2010101	1.177	410	1.023	
ID- 36-EG-	INEL	WAG 5 - PBF & ARA Assessment/Cl	EW2010102	15	1.365	1.759	
ID- 36-EG-	INEL	WAG 5 - PBF & ARA Assessment/Cl	EW2010104	840	6	1.313	
ID- 40-01-	INEL	WAG 7/RWMC (Radioactive Waste M	EW2010101	0	3.139	3.531	
ID- 40-01-	INEL	WAG 7/RWMC (Radioactive Waste M	EW2010102	0	2.360	2.168	
ID- 40-02-	INEL	Pit 9	EW2010104	0	48.113	58.697	
ID- 40-EG-	INEL	WAG 7/RWMC (Radioactive Waste M	EW2010101	3.977	0	0	
ID- 40-EG-	INEL	WAG 7/RWMC (Radioactive Waste M	EW2010102	-5.436	0	0	
ID- 40-EG-	INEL	WAG 7/RWMC (Radioactive Waste M	EW2010104	66.100	0	0	
ID- 41-EG-	INEL	WAG 10 - Misc Units Assessment	EW2010101	2.226	2.512	2.575	
ID- 41-EG-	INEL	WAG 10 - Misc Units Assessment	EW2010102	-269	254	1.535	
ID- 41-EG-	INEL	WAG 10 - Misc. Units Assessment	EW2010104	4.164	474	0	
ID- 111-E1-	INEL	Program Management Support	EW2010101	3.772	9.021	6.416	
ID- 111-E1-	INEL	Program Management Support	EW2010102	9.638	5.537	6.080	
ID- 111-EA-	INEL	Environ Science & Res Foundatio	EW2010101	279	0	0	
ID- 112-01-	INEL	Program Management Support	EW2010101	0	3.596	0	
ID-1204-WN-	INEL	WAG 3 Envir Rest - Assessment	EW2010101	2.646	1.428	1.842	
ID-1204-WN-	INEL	WAG 3 Envir Rest. - Assessment	EW2010102	0	74	957	
IDHQ-9999-10-	INEL	MIN TEAM (EM-4)	EW2010301	9	0	0	
D.ID.ND&D				99.477	87.389	100.986	Remedial Action
D.ID.PROG DIR							
D.ID.PROG DIR				0	0	0	
D.ID				105.009	93.965	109.259	
Nevada - Defense							
D.NV.COMPLIANCE							
NV- 201-AA-	NEVADA	Project Management Support	EW2010700	2.348	0	0	

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NV- 202 AA-	NEVADA	Agreements	EW2010700	0	1.971	1.097	Compliance Oversight
D.NV.COMPLIANCE				2 348	1.971	1.097	
D.NV.D&D							
NV- 221 AA	NEVADA	Decontamination and Decommissio	EW2010401	487	450	450	D&D
NV- 221-AA-	NEVADA	Decontamination and Decommissio	EW2010402	206	70	550	
D.NV.D&D				693	520	1.000	
D.NV.ND&D							
NV- 201-AA-	NEVADA	Project Management Support	EW2010301	4.986	5.207	3.655	
NV- 202-AA-	NEVADA	Agreements	EW2010301	0	394	1.231	
NV 211-AA	NEVADA	Soils Media Operable Unit	EW2010101	1 085	366	2.096	
NV- 211-AA-	NEVADA	Soils Media Operable Unit	EW2010104	1 894	4 685	6.305	
NV- 212-AA-	NEVADA	Underground Test Area Operable	EW2010101	16.008	3.364	0	
NV- 212-AA-	NEVADA	Underground Test Area Operable	EW2010102	0	19.377	22.727	
NV- 214-AA-	NEVADA	RCRA Industrial Sites	EW2010201	1.757	2 120	880	
NV- 214-AA-	NEVADA	RCRA Industrial Sites	EW2010202	2.299	3 281	8.880	
NV- 214 AA-	NEVADA	RCRA Industrial Sites	EW2010204	0	51	840	
NV- 231-AA-	NEVADA	Alaska Remedial Actions	EW2010101	395	0	0	
NV- 232-AA-	NEVADA	Colorado Remedial Actions	EW2010101	153	0	0	
NV- 232-AA	NEVADA	Colorado Remedial Actions	EW2010104	1.579	0	0	
NV- 233-AA-	NEVADA	Mississippi Remedial Actions	EW2010101	320	0	0	
NV- 234-AA-	NEVADA	Nevada Remedial Actions	EW2010101	66	0	0	
NV- 234-AA-	NEVADA	Nevada Remedial Actions	EW2010102	651	0	0	
NV- 234-AA-	NEVADA	Nevada Remedial Actions	EW2010104	99	0	0	
NV- 235-AA-	NEVADA	New Mexico Remedial Actions	EW2010101	160	0	0	
NV- 240-AA-	NEVADA	Offsite Remedial Actions	EW2010101	0	2.022	1.422	
NV- 240-AA-	NEVADA	Offsite Remedial Actions	EW2010102	0	2.558	165	
NV- 240-AA-	NEVADA	Offsite Remedial Actions	EW2010104	0	1.975	2.894	
NVHQ-9999-05-	NEVADA	MACTECH/SAFER (Magnuson)	EW2010301	50	0	0	Remedial Action
D.NV.ND&D				31 502	45.400	51.095	
D.NV.PROG DIR							
D.NV.PROG DIR				0	0	0	
D.NV				34.543	47.891	53.192	

Ohio - Defense

ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST
D.OH.COMPLIANCE						
D OH.COMPLIANCE				0	0	0
D.OH.CONSTRUCT						
D OH.CONSTRUCT				0	0	0
D.OH.D&D						
OHFN 48 B2-	FEMP	Operable Unit 3	EW2010402	14.104	18 520	28.494
OHBC 6201-DD-	BCL	BCLDP-D&D	EW2010402	8.215	8 192	482
OHRM-7200- -	RMI	RMI D&D	EW2010401	316	0	0

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OHRM-7200- -	RMI	RMI D&D	EW2010402	4.743	9.332	14.991	
OHRM-7200- -	RMI	RMI D&D	EW2010403	291	0	5.293	
D.OH.D&D				27.669	36.044	49.260	D&D
D.OH.EQUIP							
D.OH.EQUIP				0	0	0	
D.OH.LANDLORD							
OHFN- 60-D1-	FEMP	Ongoing Litigation	EW2010500	510	1.000	1.000	
OHFN- 68-D1-	FEMP	Base Services	EW2010500	60.727	41.373	55.364	Landlord
D.OH.LANDLORD				61.237	42.373	56.364	
D.OH.ND&D							
OHFN- 8-B1-	FEMP	Project Management	EW2010301	7.478	80.425	2.493	
OHFN- 8-B1-	FEMP	Project Management	EW2010302	94.114	5.959	43.573	
OHFN- 16-C3-	FEMP	Waste Management	EW2010302	31.418	16.687	16.656	
OHFN- 30-B2-	FEMP	Regulatory Oversight	EW2010102	1.940	2.600	2.800	
OHFN- 46-B2-	FEMP	Operable Unit 1	EW2010101	142	0	0	
OHFN- 46-B2-	FEMP	Operable Unit 1	EW2010102	-2.526	29.000	32.906	
OHFN- 47-B2-	FEMP	Operable Unit 2	EW2010101	-620	0	0	
OHFN- 47-B2-	FEMP	Operable Unit 2	EW2010102	8.628	4.183	17.296	
OHFN- 48-B2-	FEMP	Operable Unit 3	EW2010101	-14.765	4.318	537	
OHFN- 48-B2-	FEMP	Operable Unit 3	EW2010102	4	0	0	
OHFN- 48-B2-	FEMP	Operable Unit 3	EW2010302	3.943	5.883	11.185	
OHFN- 49-B2-	FEMP	Operable Unit 4	EW2010101	7.871	0	0	
OHFN- 49-B2-	FEMP	Operable Unit 4	EW2010102	4.435	31.042	30.680	
OHFN- 50-B2-	FEMP	Operable Unit 5	EW2010101	1.947	10	0	
OHFN- 50-B2-	FEMP	Operable Unit 5	EW2010102	11.401	16.281	18.816	
OHFN- 68-D1-	FEMP	Base Services	EW2010812	-940	0	0	
OHFN-1310-02-	FEMP	Uran Soils Integ Demo/Mgmt/Tech	EW2010301	-261	0	0	
OH-9503- -	OH-DIRECT	Ohio Program Support	EW2010301	0	0	4.609	
D.OH.ND&D				154.209	196.388	181.551	Remedial Action
D.OH.PROG DIR							
D.OH.PROG DIR				0	0	0	
D.OH				243.115	274.805	287.175	

Oak Ridge - Defense

ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST	
D.OR.COMPLIANCE							
OR-8302- -	OR-DIRECT	Agreements in Principle (AIP)	EW2010700	1.175	1.088	0	Compliance Oversight
D.OR.COMPLIANCE				1.175	1.088	0	
D.OR.D&D							
OR-2701- -	Y-12	Y-12 Plant Facilities D&D	EW2010401	2.518	3.858	1.200	
OR-2701- -	Y-12	Y-12 Plant Facilities D&D	EW2010402	2.232	0	2.580	
OR-2701- -	Y-12	Y-12 Plant Facilities D&D	EW2010403	1.276	0	3.152	
OR-3701- -	ORNL	ORNL Facilities Decontamination	EW2010401	2.100	3.752	0	

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OR-3701-	ORNL	ORNL Facilities Decontamination	EW2010402	0	0	2.500	
OR-3701-	ORNL	ORNL Facilities Decontamination	EW2010403	0	0	4.200	
OR-4701-	K-25	K-25 Facilities D&D	EW2010401	1.990	0	0	
OR-4701- -	K-25	K-25 Facilities D&D	EW2010402	457	0	0	
OR-4701- -	K-25	K-25 Facilities D&D	EW2010403	4.854	2.988	0	
OR-4999- -	K-25	Oak Ridge UF6 Cylinders	EW2010402	0	4.747	0	
D.OR.D&D				15.427	15.345	13.632	D&D
D.OR.EQUIP							
D.OR.EQUIP				0	0	0	
D.OR.LANDLORD							
OR-4401- -	K-25	Capital Equipment	EW2010500	2.630	6.353	4.243	
OR-4402- -	K-25	Landlord Capital Construction	EW2010500	6.180	0	0	
D.OR.LANDLORD				8.810	6.353	4.243	Landlord
D.OR.ND&D							
ORHQ- 100-AF-	OR-DIRECT	EM ASSESSMENT @ FO	EW2010301	0	1.606	0	
OR-2301- -	Y-12	Chestnut Ridge	EW2010301	1.094	1.825	4.816	
OR-2301- -	Y-12	Chestnut Ridge	EW2010302	0	0	9.790	
OR-2302	Y-12	Bear Creek Valley	EW2010301	5.455	5.157	0	
OR-2303	Y-12	Upper East Fork Poplar Creek (U	EW2010301	2.489	0	0	
OR-2303	Y-12	Upper East Fork Poplar Creek (U	EW2010302	5.950	13.023	0	
OR-2304	Y-12	RCRA Closure Activities	EW2010202	-506	0	0	
OR-2306- -	Y-12	Surveillance and Maintenance	EW2010302	6.035	3.100	0	
OR-2501- -	Y-12	Program Management	EW2010301	2.474	0	1.163	
OR-2501- -	Y-12	Program Management	EW2010302	0	0	1.341	
OR-3301- -	ORNL	ORNL WAG 1 Environmental Restor	EW2010301	4.615	3.300	7.626	
OR-3301- -	ORNL	ORNL WAG 1 Environmental Restor	EW2010302	0	0	11.637	
OR-3301- -	ORNL	ORNL WAG 1 Environmental Restor	EW2010304	0	0	2.525	
OR-3302- -	ORNL	ORNL WAG 2 Environmental Restor	EW2010301	2.983	3.952	0	
OR-3304- -	ORNL	ORNL WAG 4 Environmental Restor	EW2010304	0	3.140	0	
OR-3305- -	ORNL	ORNL WAG 5 Environmental Restor	EW2010301	0	2.500	0	
OR-3306	ORNL	ORNL WAG 6 Environmental Restor	EW2010302	1.123	656	0	
OR-3307 -	ORNL	ORNL WAG 7 Environmental Restor	EW2010302	4.339	1.899	0	
OR-3310- -	ORNL	ORNL WAG 10 Environmental Resto	EW2010301	1.947	2.000	0	
OR-3314-	ORNL	Surveillance and Maintenance	EW2010301	1.601	2.265	0	
OR-3315	ORNL	ORNL Area Wide G Water Prg	EW2010301	481	2.000	0	
OR-3501-	ORNL	ORNL Program Management	EW2010302	339	0	0	
OR-4401 -	K-25	Capital Equipment	EW2010812	387	0	0	
OR-4401- -	K-25	Capital Equipment	EW2010813	7	0	0	
OR-4401-	K-25	Capital Equipment	EW2010814	5	0	0	
OR-8301- -	OR-DIRECT	DOE Direct	EW2010301	4.911	1.775	2.907	
OR-8301- -	OR-DIRECT	DOE Direct	EW2010302	0	0	6.483	
OR-8301- -	OR-DIRECT	DOE Direct	EW2010304	0	0	180	
OR-8303- -	OR-DIRECT	Contract Management Support	EW2010301	3.373	4.605	0	

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OR-8304- -	OR-DIRECT	Technical Integration	EW2010301	4.100	3.868	0	
OR-8351- -	OR-DIRECT	Waste Management	EW2010202	-4.477	0	873	
OR 8390- -	ORAU	ORAU Remedial Action	EW2010301	0	11	0	
OR-8390- -	ORAU	ORAU Remedial Action	EW2010302	627	0	0	
OR-9301- -	ORR	White Oak Creek Embayment	EW2010302	0	0	9.272	
OR-9302- -	ORR	Watts Bar Reservoir	EW2010301	2.116	579	0	
OR-9303- -	ORR	Non-FFA Projects	EW2010301	-5	0	0	
OR-9303- -	ORR	Non-FFA Projects	EW2010302	2.539	3.602	0	
OR-9304- -	ORR	East Fork Poplar Creek (EFPC)	EW2010301	304	0	0	
OR-9304- -	ORR	East Fork Poplar Creek (EFPC)	EW2010302	2.226	2.682	0	
ORHQ-9999-22-	ORNL	Min/Chem (EM 4)	EW2010301	65	20	0	
ORHQ-9999-23-	Y-12	Min/Uran (EM-4)	EW2010301	64	30	0	
ORHQ-9999-27-	Y-12	Min/Lithium (EM-4)	EW2010301	80	8	0	
D.OR.ND&D				55.957	63.603	58.613	Remedial Action
D.OR.PROG DIR							
D.OR.PROG DIR				0	0	0	
D.OR				81.369	86.389	76.488	
D.RF.D&D							Rocky Flats - Defense
RF-1030- -	ROCKY FLATS	D&D of Plutonium Buildings	EW2010401	660	-8	0	
RF-1030- -	ROCKY FLATS	D&D of Plutonium Buildings	EW2010404	932	2.001	0	
RF-1031- -	ROCKY FLATS	D&D of Non-Plutonium Buildings	EW2010401	664	-718	0	
RF-1031- -	ROCKY FLATS	D&D of Non-Plutonium Buildings	EW2010404	1.193	55	0	
RF-1032- -	ROCKY FLATS	D&D of Support Buildings	EW2010401	-179	0	0	
RF-1032- -	ROCKY FLATS	D&D of Support Buildings	EW2010404	303	996	0	
RF-1233- -	ROCKY FLATS	Program Management Support - ER	EW2010401	743	779	0	
D.RF.D&D				4.316	3.105	0	D&D
D.RF.LANDLORD							
RF- 60- -	ROCKY FLATS	EM-60 OP Trans Comp Adj	EW2010500	15.500	0	0	
RF-1233- -	ROCKY FLATS	Program Management Support - ER	EW2010500	0	17.079	2.780	
RF-3812- -	ROCKY FLATS	WM Program Control	EW2010500	36.577	23.361	16.765	
RF-3812-2 -	ROCKY FLATS	Waste Char & Records	EW2010500	0	0	14.179	
RF-3813- -	ROCKY FLATS	Waste Minimization	EW2010500	1.626	1.470	1.443	
RF-3821- -	ROCKY FLATS	Waste Treatment & Processing Op	EW2010500	62.743	37.668	23.350	
RF-3821-2 -	ROCKY FLATS	Waste Storage, Shipping & Dispo	EW2010500	0	0	31.073	
RF-3822- -	ROCKY FLATS	New Facility Planning	EW2010500	573	1.500	300	
RF-3823- -	ROCKY FLATS	Waste Management GPP	EW2010500	1.062	1.000	3.000	
RF-3826- -	ROCKY FLATS	Waste Management Capital Equipm	EW2010500	2.999	2.000	3.056	
RF-3827- -	ROCKY FLATS	Sewage Treatment Plant Upgrades	EW2010500	230	450	280	
RF-3828- -	ROCKY FLATS	New Sanitary Landfill	EW2010500	954	290	0	
RF-3829 -	ROCKY FLATS	Bldg 374 Liquid Waste Treatment	EW2010500	4.050	4.650	4.275	
RF-3831- -	ROCKY FLATS	Immobilization of Misc Waste	EW2010500	0	1.900	1.700	
RF-3832- -	ROCKY FLATS	Surface Organic Contamination R	EW2010500	0	0	900	
RF-6700-0 -	ROCKY FLATS	Site Planning & Integration	EW2010500	-113	0	0	

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RF-6710- -	ROCKY FLATS	Surveillance & Maintenance	EW2010500	152 491	0	0
RF-6711 -	ROCKY FLATS	Storage Facilities S&M	EW2010500	0	38 103	32 900
RF-6712- -	ROCKY FLATS	Nuc Matls Fac S&M	EW2010500	0	68 880	61 617
RF-6713- -	ROCKY FLATS	Analytical Svcs S&M	EW2010500	0	22 430	23 060
RF 6714- -	ROCKY FLATS	Electronic Maintenance	EW2010500	0	11 587	12.900
RF 6715-	ROCKY FLATS	Non Nuc Fac S&M	EW2010500	0	6.000	1.000
RF-6720-	ROCKY FLATS	Surplus Matl Mgmt	EW2010500	31 738	40 611	32.800
RF 6723- -	ROCKY FLATS	Residue Elimination Project	EW2010500	11.378	38 900	31.040
RF 6724-	ROCKY FLATS	Solid Residues Mgmt/Ops	EW2010500	0	11.476	26 280
RF 6725 -	ROCKY FLATS	Surplus Fac Conversion	EW2010500	15.024	32.115	48.125
RF-6730- -	ROCKY FLATS	Compliance Actions	EW2010500	9.306	2 730	1.500
RF-6740- -	ROCKY FLATS	Environ Monitoring Prog	EW2010500	31.643	15.993	14.190
RF-6746- -	ROCKY FLATS	Fac Stabilization Cap Eq	EW2010500	637	3.100	1.374
RF-6748- -	ROCKY FLATS	Underground Storage Tanks	EW2010500	2.998	5.120	250
RF-6749- -	ROCKY FLATS	94 D-122 UST	EW2010500	101	80	0
RF-6750- -	ROCKY FLATS	Landlord Activities	EW2010500	51.368	70.343	30.915
RF-6751- -	ROCKY FLATS	Infrastructure Line Item	EW2010500	10 256	2.940	2.550
RF-6754-	ROCKY FLATS	92 D ES&H Enhancements	EW2010500	302	3.750	0
RF 6755- -	ROCKY FLATS	Plant Fire/Security Line Item	EW2010500	415	15.900	6.600
RF-6756- -	ROCKY FLATS	CAPASU Line Item	EW2010500	10	3 300	1.700
RF-6757- -	ROCKY FLATS	MSSA/MSTF Line Item	EW2010500	2.676	7.223	11.760
RF 6758- -	ROCKY FLATS	Critical Safety Sys & Utilities	EW2010500	-12	0	0
RF-6759- -	ROCKY FLATS	84 D 121 Safeguards & Security	EW2010500	-31	0	0
RF-6760- -	ROCKY FLATS	Domestic & Fire Water Refurb	EW2010500	-64	0	0
RF-6791- -	ROCKY FLATS	RFFO Program Support	EW2010500	3.476	0	0
D.RF.LANDLORD				449.893	491.949	443.662
D.RF.ND&D						
RF-1001- -	ROCKY FLATS	OU 1 - 881 Hillside	EW2010101	594	2.279	0
RF-1001- -	ROCKY FLATS	OU 1 - 881 Hillside	EW2010102	1.167	-154	0
RF-1001- -	ROCKY FLATS	OU 1 - 881 Hillside	EW2010104	3.078	1.020	0
RF-1002- -	ROCKY FLATS	OU 2 - 903 Pad. Mound. and East	EW2010101	4.812	622	1.306
RF-1002- -	ROCKY FLATS	OU 2 - 903 Pad. Mound. and East	EW2010102	-1 000	-106	621
RF-1002- -	ROCKY FLATS	OU 2 - 903 Pad. Mound. and East	EW2010104	2.582	173	4.614
RF 1002- -	ROCKY FLATS	OU 2 - 903 Pad. Mound. and East	EW2010301	3.334	487	1.500
RF-1005- -	ROCKY FLATS	OU 5 - Woman Creek Priority Dra	EW2010101	5.088	138	0
RF-1006- -	ROCKY FLATS	OU 8 - 700 Area	EW2010101	2.287	0	0
RF 1006-	ROCKY FLATS	OU 8 - 700 Area	EW2010304	984	0	0
RF-1007-	ROCKY FLATS	OU 12 - 400/800 Area	EW2010101	1.678	0	0
RF-1008- -	ROCKY FLATS	OU 13 - 100 Area	EW2010101	1.412	0	0
RF-1009- -	ROCKY FLATS	OU 16 - Low Priority Sites	EW2010101	5	0	0
RF-1010- -	ROCKY FLATS	OU 14 Radioactive Sites	EW2010101	1.762	0	0
RF-1011-	ROCKY FLATS	OU 3 - Offsite Areas	EW2010101	253	390	301
RF-1012-	ROCKY FLATS	Integrated Technical Program	EW2010301	8 399	5 315	10.016
RF-1012-	ROCKY FLATS	Integrated Technical Program	EW2010302	220	0	0
RF-1012- -	ROCKY FLATS	Integrated Technical Program	EW2010304	0	11 638	0

Landlord

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RF-1013- -	ROCKY FLATS	Industrial Area OUs	EW2010101	0	400	0	
RF-1013- -	ROCKY FLATS	Industrial Area OUs	EW2010201	0	106	0	
RF-1013- -	ROCKY FLATS	Industrial Area OUs	EW2010301	0	0	2.531	
RF-1013- -	ROCKY FLATS	Industrial Area OUs	EW2010304	0	3.021	1.456	
RF-1014- -	ROCKY FLATS	OU 6 - Walnut Creek	EW2010101	1.705	272	0	
RF-1014- -	ROCKY FLATS	OU 6 - Walnut Creek	EW2010102	150	0	0	
RF-1014- -	ROCKY FLATS	OU 6 - Walnut Creek	EW2010104	606	4	0	
RF-1018- -	ROCKY FLATS	OU 15 - Inside Building Closure	EW2010201	757	-181	0	
RF-1231- -	ROCKY FLATS	OU 10 - Other Outside Closures	EW2010201	1.090	0	0	
RF-1233- -	ROCKY FLATS	Program Management Support - ER	EW2010301	23.305	3.981	8.918	
RF-1233- -	ROCKY FLATS	Program Management Support - ER	EW2010304	3.396	-1.770	404	
RF-1251- -	ROCKY FLATS	OU 9 - Original Process Waste L	EW2010201	1.911	0	0	
RF-1255- -	ROCKY FLATS	OU 7 - Present Landfill	EW2010201	1.164	-239	0	
RF-1255- -	ROCKY FLATS	OU 7 - Present Landfill	EW2010204	971	1.665	5.888	
RF-1258- -	ROCKY FLATS	OU 4 - Solar Ponds	EW2010201	4.400	3.847	0	
RF-1258- -	ROCKY FLATS	OU 4 - Solar Ponds	EW2010202	-3.497	668	0	
RF-1258- -	ROCKY FLATS	OU 4 - Solar Ponds	EW2010204	24.137	-691	11.050	
RF-1261- -	ROCKY FLATS	23711 - West Spray Field	EW2010201	1.431	-97	0	
RF-1264- -	ROCKY FLATS	Onsite/Offsite Water Management	EW2010302	-26.944	0	0	
RF-1264- -	ROCKY FLATS	Onsite/Offsite Water Management	EW2010304	36.230	-429	0	
RF-1271- -	ROCKY FLATS	Sitewide Operations	EW2010301	4.834	1.848	6.887	
RF-1271- -	ROCKY FLATS	Sitewide Operations	EW2010302	0	0	2.322	
RF-1272- -	ROCKY FLATS	Design/Construction of Faciliti	EW2010301	938	28	0	
RF-1272- -	ROCKY FLATS	Design/Construction of Faciliti	EW2010302	89	7.871	2.446	Remedial Action
D.RF.ND&D				112.372	37.810	60.260	
D.RF.PROG DIR							
D.RF.PROG DIR				0	0	0	
D.RF.S&M							
RF-1015- -	ROCKY FLATS	Surveillance & Maintenance	EW2010450	0	0	400	Long-Term S&M
D.RF.S&M				0	0	400	
D.RF				566.581	532.864	504.322	
D.RL.COMPLIANCE							Richland - Defense
RL-3400-0 -	HANFORD	Program Management and Support	EW2010700	-2.162	0	0	
RL-3410-0 -	HANFORD	RL Program Management	EW2010700	4.055	2.200	2.700	Compliance Oversight
D.RL.COMPLIANCE				1.893	2.200	2.700	
D.RL.D&D							
RL-3410-0 -	HANFORD	RL Program Management	EW2010401	-113	0	0	
RL-3500-0 -	HANFORD	Asbestos Abatement	EW2010402	437	0	100	
RL-3500-0 -	HANFORD	Asbestos Abatement	EW2010404	2.240	1.558	0	
RL-3510-0 -	HANFORD	100 Area	EW2010401	9.433	3 955	3.895	
RL-3510-0 -	HANFORD	100 Area	EW2010402	490	4.220	10.665	
RL-3510-0 -	HANFORD	100 Area	EW2010404	3.750	0	0	

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RL-3520-0 -	HANFORD	200 Area	EW2010401	6.575	3.746	2.000
RL-3520-0 -	HANFORD	200 Area	EW2010402	0	0	2.000
RL-3520-0 -	HANFORD	200 Area	EW2010404	0	1.024	0
RL-3600-0 -	HANFORD	N Reactor	EW2010401	16.833	15.962	0
RL-3600-0 -	HANFORD	N Reactor	EW2010402	5.271	10.839	18.376
D.RL.D&D				44.916	41.304	37.036
D.RL.ND&D						
RLHQ- 100-RL-	RL-DIRECT	EM Assessment	EW2010301	0	2.742	0
RL-1130- -	HANFORD	CHACTERIZATION (OLD ADS)	EW2010201	-104	0	0
RL-1200- -	HANFORD	Disposal (old ads)	EW2010201	15	0	0
RL-3000-0 -	HANFORD	SST Closures	EW2010301	119	0	0
RL-3010-0 -	HANFORD	RARA/USTs	EW2010302	-31	0	0
RL-3010-0 -	HANFORD	RARA/USTs	EW2010304	7.150	4.124	3.895
RL-3020-0 -	HANFORD	RCRA Closures	EW2010201	273	0	0
RL-3020-0 -	HANFORD	RCRA Closures	EW2010202	2.372	1.205	0
RL-3100-0 -	HANFORD	100 DR Char., Assess and Remed	EW2010301	3.587	215	100
RL-3100-0 -	HANFORD	100 DR Char., Assess and Remed	EW2010302	215	1.209	0
RL-3105-0 -	HANFORD	100 BC Char., Assess and Remed	EW2010301	6.825	668	798
RL-3105-0 -	HANFORD	100 BC Char., Assess and Remed	EW2010302	1.350	12.687	23.263
RL-3110-0 -	HANFORD	100 KR Char., Assess. and Remed	EW2010301	786	383	200
RL-3110-0 -	HANFORD	100 KR Char., Assess and Remed	EW2010302	0	676	9.572
RL-3115-0 -	HANFORD	100 FR Char., Assess and Remed	EW2010301	910	454	100
RL-3115-0 -	HANFORD	100 FR Char., Assess and Remed	EW2010302	-1.476	0	0
RL-3120-0 -	HANFORD	100 HR Char., Assess and Remed	EW2010301	2.908	3.502	0
RL-3120-0 -	HANFORD	100 HR Char., Assess and Remed	EW2010302	200	8.289	1.000
RL-3125-0 -	HANFORD	100 NR Char., Assess and Remed	EW2010301	1.283	5.418	0
RL-3125-0 -	HANFORD	100 NR Char., Assess and Remed	EW2010302	3.661	3.447	0
RL-3125-0 -	HANFORD	100 NR Char., Assess and Remed	EW2010304	5.410	0	1.000
RL-3200-0 -	HANFORD	200 BP Char., Assess and Remed	EW2010301	4.726	836	0
RL-3200-0 -	HANFORD	200 BP Char., Assess and Remed	EW2010302	-648	0	500
RL-3210-0 -	HANFORD	200 PO Characterization and Ass	EW2010301	170	789	0
RL-3230-0 -	HANFORD	200 UP Characterization and Ass	EW2010301	3.672	1.159	0
RL-3230-0 -	HANFORD	200 UP Characterization and Ass	EW2010302	1.650	4.039	1.000
RL-3235 0 -	HANFORD	200 ZP Char , Assess and Remed	EW2010301	1.110	375	0
RL-3235-0 -	HANFORD	200 ZP Char , Assess and Remed	EW2010302	4.548	7.985	500
RL-3235-0 -	HANFORD	200 ZP Char , Assess and Remed	EW2010304	3.220	2.411	500
RL-3300-0 -	HANFORD	300 FF Char , Assess and Remed	EW2010301	3.003	483	294
RL-3300-0 -	HANFORD	300 FF Char , Assess and Remed	EW2010302	3	2.998	6.351
RL-3390 0 -	HANFORD	1100 EM Char , Assess and Reme	EW2010302	2.871	161	0
RL-3400-0 -	HANFORD	Program Management and Support	EW2010301	36.927	23.986	14.491
RL-3410-0 -	HANFORD	RL Program Management	EW2010301	15.209	4.792	6 152
RL-3600-0 -	HANFORD	N Reactor	EW2010811	-1.701	0	0
RL-3600-0	HANFORD	N Reactor	EW2010812	3.395	0	0
RL-3700-0	HANFORD	Disposal Facility	EW2010302	20.906	17.646	21 147
RLHQ-9028	RL DIRECT	Environ Tech Partnership (EM 50	EW2010301	0	1.000	0

D & D

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RLHQ-9033- -	RL DIRECT	Trust/Conf Survey (EM-5)	EW2010301	150	0	0	
RLHQ-9034- -	RL-DIRECT	Nuc Matls Stabi Task Group	EW2010301	33	0	0	
RLHQ-9035- -	RL-DIRECT	BEMR Support (EM-4)	EW2010301	1.800	160	0	
RLHQ-9036- -	RL DIRECT	MIN Initiative (EM-4)	EW2010301	565	0	0	
D.RL.ND&D				130.272	113.839	90.863	Remedial Action
D.RL.PROG DIR							
D.RL.PROG DIR				0	0	0	
D.RL.S&M							
RL-3800-0 -	HANFORD	Facility Surveillance and Maint	EW2010450	0	90	200	
D.RL.S&M				0	90	200	Long-Term S&M
D.RL				177.081	157.433	130.799	
Oakland - Defense							
D.SF.COMPLIANCE							
SF-1487-02-	SF-DIRECT	Contractor Support & State Gran	EW2010700	325	200	394	
D.SF.COMPLIANCE				325	200	394	Compliance Oversight
D.SF.D&D							
SF-1488-20-	SSFL (ETEC)	ETEC-D&D	EW2010402	700	3.500	1.000	D&D
D.SF.D&D				700	3.500	1.000	
D.SF.ND&D							
SF-1481-01-	LLNL	Main Site - RA	EW2010302	13.329	10.542	10.988	
SF-1481-03-	LLNL	Site 300 RI	EW2010101	77	400	550	
SF-1481-04-	LLNL	Site 300 RCRA	EW2010202	59	200	1.200	
SF-1481-05-	LLNL	OU#1/GSA OFFSITE	EW2010301	1.649	872	160	
SF-1481-05-	LLNL	OU#1/GSA OFFSITE	EW2010302	428	650	1.440	
SF-1481-05-	LLNL	OU#1/GSA OFFSITE	EW2010304	0	0	120	
SF-1481-06-	LLNL	OU#2/Building 834	EW2010301	1.903	1.250	0	
SF-1481-06-	LLNL	OU#2/Building 834	EW2010302	0	0	1.700	
SF-1481-07-	LLNL	OU#3/Pit 6 Landfill Area	EW2010301	339	1.150	0	
SF-1481-08-	LLNL	OU#4/HE Process Area	EW2010301	331	1.196	362	
SF-1481-09-	LLNL	1256/East and West Firing Areas	EW2010301	1.050	1.325	549	
SF-1481-09-	LLNL	1256/East and West Firing Areas	EW2010302	0	0	548	
SF-1481-10-	LLNL	OU#6/Bldg .832 Canyon	EW2010301	1.093	1.300	1.480	
SF-1481-30-	LLNL	Program Management	EW2010301	4.582	4.332	1.088	
SF-1481-30-	LLNL	Program Management	EW2010302	0	0	2.327	
SF-1487-02-	SF-DIRECT	Contractor Support & State Gran	EW2010101	172	0	0	
SF-1487-02-	SF-DIRECT	Contractor Support & State Gran	EW2010301	0	175	175	
D.SF.ND&D				25.012	23.392	22.687	Remedial Action
D.SF.PROG DIR							
D.SF.PROG DIR				0	0	0	
D.SF				26.037	27.092	24.081	

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Savannah River - Defense

ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST	
D SR.COMPLIANCE							
SR- 478-A -	SAVANNAH RIV	Federal Facility Agreement	EW2010700	31	1.495	1 420	
SR- 481-A -	SAVANNAH RIV	Agreement In Principle	EW2010700	242	2.567	2.139	
D.SR.COMPLIANCE				273	4.062	3.559	Compliance Oversight
D.SR.D&D							
SR- 60- -	SAVANNAH RIV	C.P.R Reactors	EW2010401	21.836	17.453	8.973	
SR- 601-AA-	SAVANNAH RIV	R-Area	EW2010403	-396	0	0	
SR 602-AA	SAVANNAH RIV	F Area	EW2010403	-97	0	0	
SR- 605-AA-	SAVANNAH RIV	H-Area	EW2010403	5	0	0	
SR- 606-AA-	SAVANNAH RIV	A Area	EW2010401	-2.520	0	0	
SR- 610-AA-	SAVANNAH RIV	D&D Program Management	EW2010401	1.691	0	0	
D.SR.D&D				20.519	17.453	8.973	D&D
D.SR.ND&D							
SR- 479-A -	SAVANNAH RIV	DOE/ER Program Management Suppo	EW2010301	1.128	2.157	0	
SR- 501-AA-	SAVANNAH RIV	SRL & TNX Basins	EW2010201	99	1.111	1.039	
SR- 501-AA-	SAVANNAH RIV	SRL & TNX Basins	EW2010202	-113	0	414	
SR- 501-AA-	SAVANNAH RIV	SRL & TNX Basins	EW2010301	256	1.370	798	
SR- 501-AA-	SAVANNAH RIV	SRL & TNX Basins	EW2010302	0	0	21	
SR- 502-AA-	SAVANNAH RIV	Coal Pile Runoff & Ash Basins	EW2010301	646	916	1.782	
SR- 502-AA-	SAVANNAH RIV	Coal Pile Runoff & Ash Basins	EW2010302	0	0	434	
SR- 503 AA-	SAVANNAH RIV	Acid/Caustic Basins	EW2010201	96	128	65	
SR- 503-AA-	SAVANNAH RIV	Acid/Caustic Basins	EW2010202	-141	333	0	
SR- 503-AA-	SAVANNAH RIV	Acid/Caustic Basins	EW2010301	-7	0	0	
SR- 504-AA-	SAVANNAH RIV	Oil & Chemical Basins	EW2010301	2.136	2.591	3.634	
SR- 504-AA-	SAVANNAH RIV	Oil & Chemical Basins	EW2010302	-14	199	777	
SR- 504-AA-	SAVANNAH RIV	Oil & Chemical Basins	EW2010304	0	2.212	0	
SR- 505-AA-	SAVANNAH RIV	Reactor Basins	EW2010301	929	2.987	3.493	
SR- 505-AA-	SAVANNAH RIV	Reactor Basins	EW2010302	0	0	10	
SR- 505-AA-	SAVANNAH RIV	Reactor Basins	EW2010304	0	1.029	0	
SR- 506 AA-	SAVANNAH RIV	Separations Basins	EW2010301	2 115	3.468	422	
SR- 506-AA-	SAVANNAH RIV	Separations Basins	EW2010302	11	4	1.734	
SR- 506-AA-	SAVANNAH RIV	Separations Basins	EW2010304	0	1.981	0	
SR- 507-AA-	SAVANNAH RIV	Basin Sewer Lines	EW2010201	-65	0	0	
SR- 507-AA-	SAVANNAH RIV	Basin Sewer Lines	EW2010301	-1	0	0	
SR- 508-AA-	SAVANNAH RIV	Burning Pits	EW2010301	1.449	2.790	0	
SR 508-AA-	SAVANNAH RIV	Burning Pits	EW2010302	-40	50	0	
SR- 509-AA-	SAVANNAH RIV	Rubble Pits & Piles	EW2010301	2.657	2.314	7.089	
SR- 509 AA-	SAVANNAH RIV	Rubble Pits & Piles	EW2010302	0	428	0	
SR- 510 AA-	SAVANNAH RIV	Radioactive Burial Grounds	EW2010301	878	1.185	1.028	
SR- 510 AA-	SAVANNAH RIV	Radioactive Burial Grounds	EW2010302	506	7 597	13.366	
SR 510-AA-	SAVANNAH RIV	Radioactive Burial Grounds	EW2010304	0	530	0	
SR- 511-AA-	SAVANNAH RIV	Non Radioactive Burial Grounds	EW2010301	61	0	0	
SR- 511-AA-	SAVANNAH RIV	Non Radioactive Burial Grounds	EW2010302	13.005	4.859	8.444	
SR 512-AA-	SAVANNAH RIV	Storage Tanks	EW2010301	118	1.200	270	

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SR- 512-AA-	SAVANNAH RIV	Storage Tanks	EW2010302	0	0	157
SR- 512-AA-	SAVANNAH RIV	Storage Tanks	EW2010304	0	370	0
SR- 513-AA-	SAVANNAH RIV	Minimal Action Units	EW2010301	157	256	20
SR- 514-AA-	SAVANNAH RIV	Reactor Areas Groundwater	EW2010101	234	0	0
SR- 515-AA-	SAVANNAH RIV	200 Area Groundwater	EW2010101	6	283	500
SR- 515-AA-	SAVANNAH RIV	200 Area Groundwater	EW2010201	7,024	4,530	2,095
SR- 515-AA-	SAVANNAH RIV	200 Area Groundwater	EW2010202	8,387	7,194	12,590
SR- 515-AA-	SAVANNAH RIV	200 Area Groundwater	EW2010301	-9	0	0
SR- 516-AA-	SAVANNAH RIV	3/700 Area Groundwater	EW2010201	0	1,875	6,600
SR- 516-AA-	SAVANNAH RIV	3/700 Area Groundwater	EW2010202	7,131	3,818	1,800
SR- 517-AA-	SAVANNAH RIV	400 Area Groundwater	EW2010201	1,552	131	0
SR- 517-AA-	SAVANNAH RIV	400 Area Groundwater	EW2010202	0	1,674	1,191
SR- 518-AA-	SAVANNAH RIV	600 Area Groundwater	EW2010301	145	1,258	350
SR- 518-AA-	SAVANNAH RIV	600 Area Groundwater	EW2010302	1,423	71	1,422
SR- 701-AA-	SAVANNAH RIV	Post Closure Management	EW2010301	10,239	4,084	7,655
SR- 701-AA-	SAVANNAH RIV	Post Closure Management	EW2010302	0	2,696	4,897
SR- 801-AA-	SAVANNAH RIV	ER Program Support	EW2010301	26,103	7,005	8,874
SRHQ-9999-04-	SAVANNAH RIV	MIN (EM-4)	EW2010301	5	0	0
D,SR,ND&D				87,870	76,684	92,971

Remedial Action

ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST
D,SR,PROG DIR						
D,SR,PROG DIR				0	0	0
D,SR,S&M						
SR- 701-AA-	SAVANNAH RIV	Post Closure Management	EW2010450	1,507	1,619	1,954
D,SR,S&M				1,507	1,619	1,954
D,SR				110,169	99,818	107,457
D SUBTOTAL				1,669,380	1,804,052	1,762,194

Long Term S&M

Headquarters - D&D Fund

ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST
F,HQ,ND&D						
F,HQ,ND&D				0	0	0
F,HQ,URAN REIMB						
HQ-4000- -	HEADQUARTERS	UR/TH Reimbursements	EU2010950	41,700	42,000	42,000
F,HQ,URAN REIMB				41,700	42,000	42,000
F,HQ				41,700	42,000	42,000

Uranium Reimbursement

ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST
F,ID,ND&D						
F,ID,ND&D				0	0	0
F,ID				0	0	0

Oak Ridge - D&D Fund

ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST
F,OR,COMPLIANCE						
OR-8301- -	OR-DIRECT	DOE Direct	EU2010700	0	0	8,500
OR-8302- -	OR-DIRECT	Agreements in Principle (AIP)	EU2010700	4,032	3,248	0
F,OR,COMPLIANCE				4,032	3,248	8,500

Compliance Oversight

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ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST	
F.OR.D&D							
OR-4601- -	K-25	TSCA Operations	EU2010402	0	6 000	0	
OR-4701- -	K-25	K 25 Facilities D&D	EU2010401	459	1,044	1.200	
OR-4701- -	K-25	K 25 Facilities D&D	EU2010402	23.285	7,598	9 250	
OR-4701- -	K 25	K 25 Facilities D&D	EU2010403	32.496	48.643	30.858	
OR-5701- -	PADUCAH	Facility Decontamination and De	EU2010401	2 820	2 500	1.861	
OR-6701- -	PORTSMOUTH	Portsmouth Sitewide D&D	EU2010401	3.644	2.382	810	
F.OR.D&D				62 704	68.167	43 979	D&D
F.OR.EQUIP							
F OR.EQUIP				0	0	0	
F.OR.LANDLORD							
OR-4401- -	K-25	Capital Equipment	EU2010500	652	9 574	9.500	
OR-4402- -	K-25	Landlord Capital Construction	EU2010500	9.711	0	0	
F.OR.LANDLORD				10 363	9.574	9.500	Landlord
F.OR.ND&D							
OR-4301- -	K-25	Main Plant Area	EU2010301	881	0	5.000	
OR-4301- -	K-25	Main Plant Area	EU2010302	4.045	2 091	5 500	
OR-4303-	K-25	External Plant Area	EU2010301	3.718	3.635	0	
OR 4304- -	K 25	Status Review agement Project	EU2010202	16 530	0	0	
OR-4304- -	K 25	Status Review agement Project	EU2010301	0	8.159	0	
OR-4305- -	K-25	Groundwater Program	EU2010301	4.388	1 600	0	
OR 4306- -	K-25	Surveillance and Maintenance	EU2010301	1 366	1 724	0	
OR-4501- -	K-25	Program Management	EU2010301	6 167	0	0	
OR 4501- -	K-25	Program Management	EU2010302	0	0	5 600	
OR 5201- -	PADUCAH	Waste Management - Treatment	EU2010202	0	0	15.900	
OR 5201- -	PADUCAH	Waste Management Treatment	EU2010301	4.543	7.702	0	
OR 5202- -	PADUCAH	Waste Management Storage	EU2010301	7.910	7.541	0	
OR-5203- -	PADUCAH	Waste Management Disposal	EU2010301	9.250	2.310	0	
OR 5301 -	PADUCAH	Support Facilities	EU2010301	-77	0	1 389	
OR-5301-	PADUCAH	Support Facilities	EU2010302	4.554	1.311	9 475	
OR 5302-	PADUCAH	Site Ground Water Contamination	EU2010301	-252	0	0	
OR 5302- -	PADUCAH	Site Ground Water Contamination	EU2010302	12.476	14 650	0	
OR 5303 -	PADUCAH	WAGs 5 & 11	EU2010301	-43	0	0	
OR 5304- -	PADUCAH	WAGs 1 & 7	EU2010301	432	1 260	0	
OR-5305- -	PADUCAH	WAG 13	EU2010301	-224	0	0	
OR-5309- -	PADUCAH	WAGs 17 & 6	EU2010301	1 570	0	0	
OR-5311-	PADUCAH	Ground Water Program	EU2010301	2.706	4 227	0	
OR 5312- -	PADUCAH	Underground Storage Tanks	EU2010301	12	0	0	
OR-5312- -	PADUCAH	Underground Storage Tanks	EU2010302	101	0	0	
OR 5313-	PADUCAH	WAGs 2. 3. & 14	EU2010301	-420	0	0	
OR 5314-	PADUCAH	Surveillance and Maintenance	EU2010301	4 019	1 002	0	
OR-5501	PADUCAH	Program Management	EU2010301	4 268	5 800	1 474	
OR-5501-	PADUCAH	Program Management	EU2010302	0	0	4 211	

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ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST
OR-5501- -	PADUCAH	Program Management	EU2010814	449	0	0
OR-6201- -	PORTSMOUTH	Waste Management - Treatment	EU2010202	6.854	11.262	31.414
OR-6202- -	PORTSMOUTH	Waste Management - Storage	EU2010202	14.502	15.043	0
OR-6203- -	PORTSMOUTH	Waste Management - Disposal	EU2010202	7.518	8.121	0
OR-6301- -	PORTSMOUTH	Quadrant I RFI/CMS/CMI	EU2010201	5.103	5.076	7.963
OR-6301- -	PORTSMOUTH	Quadrant I RFI/CMS/CMI	EU2010202	4.067	0	15.700
OR-6302- -	PORTSMOUTH	Quadrant II RFI/CMS/CMI	EU2010201	584	2.994	0
OR-6302- -	PORTSMOUTH	Quadrant II RFI/CMS/CMI	EU2010202	329	0	0
OR-6303- -	PORTSMOUTH	Quadrant III RFI/CMS/CMI	EU2010201	712	582	0
OR-6303- -	PORTSMOUTH	Quadrant III RFI/CMS/CMI	EU2010202	460	0	0
OR-6304- -	PORTSMOUTH	Quadrant IV RFI/CMS/CMI	EU2010201	1.435	858	0
OR-6304- -	PORTSMOUTH	Quadrant IV RFI/CMS/CMI	EU2010202	1.318	0	0
OR-6306- -	PORTSMOUTH	Ground Water Protection Program	EU2010201	35	0	0
OR-6306- -	PORTSMOUTH	Ground Water Protection Program	EU2010202	9.307	6.604	0
OR-6307- -	PORTSMOUTH	Underground Storage Tanks/Above	EU2010202	894	0	0
OR-6308- -	PORTSMOUTH	Waste Storage, Treatment, and D	EU2010201	2.010	0	0
OR-6309- -	PORTSMOUTH	RCRA Closures	EU2010202	3.056	0	0
OR-6501- -	PORTSMOUTH	Program Management	EU2010201	5.400	4.991	4.250
OR-6801- -	PORTSMOUTH	Remedial Action Surveillance &	EU2010201	50	0	0
OR-6801- -	PORTSMOUTH	Remedial Action Surveillance &	EU2010202	765	1.042	700
OR-8301- -	OR-DIRECT	DOE Direct	EU2010301	1.299	6.288	5.857
OR-8301- -	OR-DIRECT	DOE Direct	EU2010302	0	0	12.200
OR-8301- -	OR-DIRECT	DOE Direct	EU2010304	0	0	398
OR-8303- -	OR-DIRECT	Contract Management Support	EU2010301	6.048	15.406	0
OR-8304- -	OR DIRECT	Technical Integration	EU2010301	8.389	9.872	0
OR-8351- -	OR-DIRECT	Waste Management	EU2010202	13.896	4.088	5.780
OR-9301- -	ORR	White Oak Creek Embayment	EU2010301	0	0	3.410
OR-9302- -	ORR	Watts Bar Reservoir	EU2010301	2.116	579	0
F.OR.ND&D				182.528	155.818	136.221

Remedial Action

ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST
F.OR.URAN REIMB						
F.OR.URAN REIMB				0	0	0
F.OR				259.627	236.807	198.200
F SUBTOTAL				301.327	278.807	240.200

Albuquerque - Non-Defense

ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST
N.AL.COMPLIANCE						
ALGJ-1001- -	GJPO	Monticello Remedial Action Proj	EX2010700	93	150	200
N.AL.COMPLIANCE				93	150	200

Compliance Oversight

ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST
N.AL.D&D						
ALOR- 381- -	GJPO	GJPORAP Independent Verificatio	EX2010402	454	400	358
ALGJ-1005- -	GJPO	Grand Junction Projects Office	EX2010402	972	2.650	5.012
ALGJ-1005- -	GJPO	Grand Junction Projects Office	EX2010403	170	250	338
ALLA-1054- -	LANL	Phase Separator Pit Decommissio	EX2010401	1.611	0	0
ALLA-3001-	LANL	Decontamination and Decommissio	EX2010401	1	0	0
N.AL.D&D				3.208	3.300	5.708

D & D

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N.AL.EQUIP							
N.AL.EQUIP				0	0	0	
N.AL.LANDLORD							
ALGJ-1006- -	GJPO	Grand Junction Projects Office	EX2010500	6.255	7.403	5.629	
ALGJ-1009- -	GJPO	Waste Management Facility Opera	EX2010500	845	1.650	1.578	
ALGJ-1010- -	GJPO	Waste Minimization	EX2010500	55	250	289	
ALGJ-1011- -	GJPO	GJPO General Plant Projects	EX2010500	0	23	0	
N.AL.LANDLORD				7.155	9.326	7.496	Landlord
N.AL.ND&D							
ALOR- 320- -	GJPO	Monticello Surveys/IVC Support	EX2010101	394	400	448	
ALGJ-1001- -	GJPO	Monticello Remedial Action Proj	EX2010102	14.402	25.710	27.610	
ALGJ-1002- -	GJPO	Monticello Surface and Ground W	EX2010101	1.786	1.456	3.197	
ALGJ-1003- -	GJPO	Monticello Vicinity Properties	EX2010102	6.125	5.069	1.371	
ALGJ-1007- -	GJPO	Uranium Leasing	EX2010301	-124	0	0	
ALIT-1013- -	ITRI	Diesel Oil Assessment and Remed	EX2010202	43	0	0	
ALIT-1015- -	ITRI	Hot Pond Assessment and Remedia	EX2010201	40	0	0	
ALIT-1015- -	ITRI	Hot Pond Assessment and Remedia	EX2010202	250	0	0	
ALIT-1019- -	ITRI	Groundwater and Sanitary Lagoon	EX2010202	621	1.000	15	
ALIT-1023- -	ITRI	Environmental Assessment and Re	EX2010102	0	360	0	
ALIT-1023- -	ITRI	Environmental Assessment and Re	EX2010202	748	0	310	
N.AL.ND&D				24.285	33.995	32.951	Remedial Action
N.AL.S&M							
ALGJ-1004- -	GJPO	Long Term Surveillance and Main	EX2010450	766	929	1.435	Long Term S&M
N.AL.S&M				766	929	1.435	
UMTRA - Ground		Non-Defense					
N.AL.UMTRA-G							
ALUM-2000- -	UMTRA-G	UMTRA Ground water remedial act	EX2050010	2.758	3.000	3.200	
ALUM-2000- -	UMTRA-G	UMTRA Ground water remedial act	EX2050020	1.000	0	64	
ALUM-2023- -	UMTRA-G	UMTRA Ground Water Program Mana	EX2050010	3.242	4.800	4.391	
ALUM-2023- -	UMTRA-G	UMTRA Ground Water Program Mana	EX2050020	0	0	145	
N.AL.UMTRA-G				7.000	7.800	7.800	Remedial Action
UMTRA - Surface		Non-Defense					
N.AL.UMTRA-S							
ALUM-1322- -	UMTRA-S	UMTRA Surface Ambrosia Lake Rem	EX2040010	57	0	0	
ALUM-1322- -	UMTRA-S	UMTRA Surface Ambrosia Lake Rem	EX2040020	3.654	0	0	
ALUM-1325- -	UMTRA-S	UMTRA Surface Belfield/Bowman R	EX2040010	16	0	0	
ALUM-1330- -	UMTRA-S	UMTRA Surface Falls City Remedi	EX2040020	10	0	0	
ALUM-1332- -	UMTRA-S	UMTRA Surface Grand Junction Re	EX2040010	78	1.287	1.206	
ALUM-1332- -	UMTRA-S	UMTRA Surface Grand Junction Re	EX2040020	10.094	15.862	6.561	
ALUM-1337- -	UMTRA-S	UMTRA Surface Gunnison Remediat	EX2040010	174	55	0	
ALUM 1337- -	UMTRA-S	UMTRA Surface Gunnison Remediat	EX2040020	3.583	168	0	
ALUM-1344- -	UMTRA-S	UMTRA Surface Maybell Remediati	EX2040010	195	166	120	

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ALUM-1344-	UMTRA S	UMTRA Surface Maybell Remediati	EX2040020	8.068	8.776	2.000	
ALUM-1346-	UMTRA S	UMTRA Surface Mexican Hat Remed	EX2040010	120	0	0	
ALUM-1346-	UMTRA S	UMTRA Surface Mexican Hat Remed	EX2040020	1.317	0	0	
ALUM 1351-	UMTRA S	UMTRA Surface Naturita Remediat	EX2040010	158	138	46	
ALUM-1351- -	UMTRA S	UMTRA Surface Naturita Remediat	EX2040020	238	7.253	10.987	
ALUM-1354-	UMTRA-S	UMTRA Surface Rifle (2 Sites) R	EX2040010	255	37	0	
ALUM 1354-	UMTRA S	UMTRA Surface Rifle (2 Sites) R	EX2040020	22.083	4.498	0	
ALUM 1361-	UMTRA S	UMTRA Surface Slick Rock (2 Sit	EX2040010	178	166	72	
ALUM-1361- -	UMTRA-S	UMTRA Surface Slick Rock (2 Sit	EX2040020	10.754	9.322	2.753	
ALUM-1362- -	UMTRA S	UMTRA Surface Program Managemen	EX2040010	3.617	5.628	4.826	
ALUM-1362- -	UMTRA-S	UMTRA Surface Program Managemen	EX2040020	22.897	10.133	13.459	
ALUM 1363- -	UMTRA S	UMTRA Surface Surveillance and	EX2040010	622	1.324	1.556	
ALUM 1364- -	UMTRA S	UMTRA Surface Completed Sites R	EX2040010	194	62	0	
ALUM-1364- -	UMTRA S	UMTRA Surface Completed Sites R	EX2040020	1.622	1.071	1.653	
ALUM-1365- -	UMTRA S	UMTRA Surface State Share	EX2040020	-6.084	0	-2.272	
N.AL.UMTRA-S				83.900	65.946	42.967	Remedial Action
Albuquerque - Non-Defense							
N.AL.URAN LEASE							
ALGJ 1008- -	GJPO	Uranium Leasing	EX2010600	353	300	900	Uranium Leasing
N.AL.URAN LEASE				353	300	900	
N.AL				126.760	121.746	99.457	
N.CH.COMPLIANCE							
N.CH.COMPLIANCE				0	0	0	
N.CH.CONSTRUCT							
N.CH.CONSTRUCT				0	0	0	
N.CH.D&D							
CH-1436- -	ANL-EAST	Facility Conversion D&D Project	EX2010402	2.247	830	0	
CH-1436- -	ANL-EAST	Facility Conversion D&D Project	EX2010403	548	0	0	
CH-1437- -	ANL-EAST	Reactor Facilities D&D Projects	EX2010402	1.646	2.030	4.295	
CH-1437- -	ANL-EAST	Reactor Facilities D&D Projects	EX2010403	354	0	0	
CH-1438- -	ANL-EAST	Support Facilities D&D Projects	EX2010401	452	1.164	0	
CH-1438- -	ANL EAST	Support Facilities D&D Projects	EX2010402	2.365	0	474	
CH 1438- -	ANL EAST	Support Facilities D&D Projects	EX2010403	664	0	0	
CH-1438- -	ANL-EAST	Support Facilities D&D Projects	EX2010404	1.157	0	0	
CH-1439- -	ANL EAST	Program Management	EX2010402	0	0	300	
CH-1703- -	ANL-WEST	CLPA Decontamination & Decommis	EX2010401	0	3	3	
CH-1703- -	ANL WEST	CLPA Decontamination & Decommis	EX2010403	3	0	0	
CH-6202-AN-	ANL EAST	BCLDP Prog Mgmt Support	EX2010401	0	23	0	
N.CH.D&D				9.436	4.050	5.072	D&D
N.CH.FUSRAP							
N.CH.FUSRAP				0	0	0	

ENVIRONMENTAL RESTORATION
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ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST
N.CH.ND&D						
CH-1432- -	ANL-EAST	Remedial Support Activities	EX2010201	110	388	307
CH-1433- -	ANL-EAST	Solid Waste Storage/Disposal	EX2010201	605	0	345
CH-1433- -	ANL-EAST	Solid Waste Storage/Disposal	EX2010202	95	222	0
CH-1433- -	ANL-EAST	Solid Waste Storage/Disposal	EX2010204	200	0	405
CH-1434- -	ANL-EAST	Mixed Waste Storage/Disposal Fa	EX2010201	1.084	1.829	236
CH-1434- -	ANL-EAST	Mixed Waste Storage/Disposal Fa	EX2010204	676	0	1.514
CH-1439- -	ANL-EAST	Program Management	EX2010201	0	0	150
CH-1439- -	ANL-EAST	Program Management	EX2010204	0	0	150
CH-1439- -	ANL-EAST	Program Management	EX2010301	0	222	0
CH-1700- -	ANL-WEST	Program Management	EX2010101	50	100	118
CH-1702- -	ANL-WEST	WAG 9 Assessment	EX2010101	450	838	1.597
CH-2300- -	BNL	Program Management	EX2010301	1.519	1.724	1.789
CH-2300-AN-	ANL-EAST	Tech Support to BNL	EX2010301	267	50	0
CH-2300-SN-	BNL	BNL Enviorn Restoration Program	EX2010301	300	0	0
CH-2302- -	BNL	Sitewide Activities	EX2010301	1.382	877	653
CH-2303- -	BNL	Operable Unit I	EX2010301	3.389	636	7
CH-2303- -	BNL	Operable Unit I	EX2010302	0	21	447
CH-2303- -	BNL	Operable Unit I	EX2010304	0	1.539	8.715
CH-2303-BN-	BNL	INEL Suppor to BNL Activities	EX2010301	30	0	0
CH-2304- -	BNL	Operable Unit II	EX2010301	-76	4.208	577
CH-2304- -	BNL	Operable Unit II	EX2010302	0	0	196
CH-2305- -	BNL	Operable Unit III	EX2010301	1.479	7.334	440
CH-2306- -	BNL	Operable Unit IV	EX2010301	512	0	0
CH-2306- -	BNL	Operable Unit IV	EX2010302	0	1.794	2.531
CH-2307- -	BNL	Operable Unit V	EX2010301	2.309	1.382	356
CH-2307- -	BNL	Operable Unit V	EX2010302	0	0	235
CH-2310- -	BNL	Removal Actions	EX2010301	2.356	0	0
CH-2310- -	BNL	Removal Actions	EX2010304	0	496	4.054
CH-3200- -	CH-DIRECT	PPPL - Prog Mgmt. Suppt.	EX2010301	212	245	250
CH-3201- -	CH-DIRECT	PPPL - Grdwater Charact/Remedia	EX2010301	0	0	250
CH-8200- -	CH-DIRECT	Chicago Prog. Mgmt. Support	EX2010301	88	987	1.726
CH-8200-AN-	ANL-EAST	Tech Sup to CH	EX2010301	0	10	0
CH-8207- -	CH-DIRECT	Site A/Plot M Remediation	EX2010301	6	0	0
CH-8208- -	CH-DIRECT	PPPL - Site A & B	EX2010201	250	0	705
N.CH.ND&D				17.293	24.902	27.753
N.CH.S&M						
CH-8202- -	CH-DIRECT	Hallam Surveillance and Mainten	EX2010450	22	22	20
CH-8203- -	CH-DIRECT	Piqua Surveillance and Maintena	EX2010450	12	12	10
N.CH.S&M				34	34	30
N.CH.UMTRA-S						
N.CH.UMTRA-S				0	0	0
N.CH				26.763	28.986	32.855

Remedial Action

Long Term S&M

ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST	
N.HQ.D&D				0	0	0	
N.HQ.D&D							
N.HQ.EQUIP				0	0	0	
N.HQ.EQUIP							
N.HQ.FUSRAP				0	0	0	
N.HQ.FUSRAP							
N.HQ.ND&D							
HQ- 2-00-	HEADQUARTERS	Technical Support to Environmen	EX2010301	34.589	9.449	8.511	Remedial Action
N.HQ.ND&D				34.589	9.449	8.511	
N.HQ.UMTRA-G				0	0	0	
N.HQ.UMTRA-G							
N.HQ.UMTRA-S				0	0	0	
N.HQ.UMTRA-S							
N.HQ				34.589	9.449	8.511	
N.ID.D&D				0	0	0	
N.ID.D&D							
N.ID.ND&D				0	0	0	
N.ID.ND&D				0	0	0	
N.ID							
N.NV.D&D				0	0	0	
N.NV.D&D							
N.NV.FUSRAP				0	0	0	
N.NV.FUSRAP				0	0	0	
N.NV							

Ohio - Non-Defense

ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST	
N.OH.D&D							
OHBC-6201-DD-	BCL	BCLDP-D&D	EX2010402	14.502	11.568	500	D&D
OHBC-6201-DD-	BCL	BCLDP-D&D	EX2010403	2.305	0	3.000	
N.OH.D&D				16.807	11.568	3.500	
N.OH.ND&D							
OHHQ-9001- -	OH-DIRECT	West Valley Seneca (EM-5)	EX2010301	100	100	0	Remedial Action
N.OH.ND&D				100	100	0	
N.OH				16.907	11.668	3.500	

Oak Ridge - Non-Defense

ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST
N.OR.COMPLIANCE						
OR-8302 -	OR-DIRECT	Agreements in Principle (AIP)	EX2010700	0	892	0

ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST	
N.OR.COMPLIANCE				0	892	0	Compliance Oversight
N.OR.D&D							
OR-3701- -	ORNL	ORNL Facilities Decontamination	EX2010401	8.954	10.300	0	
OR-3701- -	ORNL	ORNL Facilities Decontamination	EX2010402	2.876	0	13.370	
N.OR.D&D				11.830	10.300	13.370	D&D
FUSRAP - Non-Defense							
N.OR.FUSRAP							
OR-1301-AA-	FUSRAP	New York Sites - Assessment & C	EX2020010	2.682	1.786	688	
OR-1301-AA-	FUSRAP	New York Sites - Assessment & C	EX2020020	524	50	22.231	
OR-1301-AA-	FUSRAP	New York Sites - Assessment & C	EX2020040	15.433	13.185	809	
OR-1302-AA-	FUSRAP	New Jersey Sites - Assessment &	EX2020010	3.132	2.381	948	
OR-1302-AA-	FUSRAP	New Jersey Sites - Assessment &	EX2020020	39	50	23.587	
OR-1302-AA-	FUSRAP	New Jersey Sites - Assessment &	EX2020040	15.713	26.750	0	
OR-1303-AA-	FUSRAP	Missouri Sites - Assessment & C	EX2020010	2.052	2.776	512	
OR-1303-AA-	FUSRAP	Missouri Sites - Assessment & C	EX2020020	30	50	15.000	
OR-1303-AA-	FUSRAP	Missouri Sites - Assessment & C	EX2020040	12.853	12.320	0	
OR-1304-AA-	FUSRAP	Other Sites - Assessment & Clea	EX2020010	2.413	2.274	7.107	
OR-1304-AA-	FUSRAP	Other Sites - Assessment & Clea	EX2020020	16.321	7.380	8.449	
OR-1304-AA-	FUSRAP	Other Sites - Assessment & Clea	EX2020040	-2	2.805	1.573	
OR-1310-AA-	FUSRAP	ORNL - FUSRAP Support	EX2020010	1.535	800	800	
OR-1312-AA-	FUSRAP	ORISE - FUSRAP Support	EX2020010	762	700	700	
OR-1312-AA-	FUSRAP	ORISE - FUSRAP Support	EX2020020	-62	0	0	
OR-1321-AA-	FUSRAP	ANL Program Support	EX2020010	675	675	675	
N.OR.FUSRAP				74.100	73.982	83.079	Remedial Action
Oak Ridge - Non-Defense							
N.OR.ND&D							
OR-3301- -	ORNL	ORNL WAG 1 Environmental Restor	EX2010301	8.597	14.030	6.361	
OR-3301- -	ORNL	ORNL WAG 1 Environmental Restor	EX2010302	648	662	7.990	
OR-3301- -	ORNL	ORNL WAG 1 Environmental Restor	EX2010304	2.196	0	1.589	
OR-3302- -	ORNL	ORNL WAG 2 Environmental Restor	EX2010301	1.118	2.074	0	
OR-3304- -	ORNL	ORNL WAG 4 Environmental Restor	EX2010304	1.950	0	0	
OR-3305- -	ORNL	ORNL WAG 5 Environmental Restor	EX2010301	1.738	0	0	
OR-3305- -	ORNL	ORNL WAG 5 Environmental Restor	EX2010304	335	0	0	
OR-3306- -	ORNL	ORNL WAG 6 Environmental Restor	EX2010302	4.057	0	0	
OR-3307- -	ORNL	ORNL WAG 7 Environmental Restor	EX2010302	1.000	0	0	
OR-3310- -	ORNL	ORNL WAG 10 Environmental Resto	EX2010301	51	0	0	
OR-3310- -	ORNL	ORNL WAG 10 Environmental Resto	EX2010302	600	0	0	
OR-3311- -	ORNL	ORNL WAG 11 Environmental Resto	EX2010302	-68	0	0	
OR-3312- -	ORNL	ORNL WAG 13 Environmental Resto	EX2010302	-196	0	0	
OR-3313- -	ORNL	ORNL Inactive Liquid Low-Level	EX2010302	-97	0	0	
OR-3314- -	ORNL	Surveillance and Maintenance	EX2010301	4.600	2.596	0	
OR-3315- -	ORNL	ORNL Area-Wide G'Water Prg	EX2010301	963	0	0	
OR-3501- -	ORNL	ORNL Program Management	EX2010301	0	0	1.902	
OR-3501- -	ORNL	ORNL Program Management	EX2010302	7.307	0	4.584	
OR-3501- -	ORNL	ORNL Program Management	EX2010304	0	0	938	

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ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST	
OR-7301- -	WSSRAP	Project Integration	EX2010102	17.145	24.250	23.498	
OR-7302- -	WSSRAP	Support Facilities	EX2010102	5.067	8.550	12.972	
OR-7303- -	WSSRAP	Quarry	EX2010102	7.600	4.650	2.693	
OR-7304- -	WSSRAP	Raffinate Pits	EX2010102	3.100	7.150	7.165	
OR-7305- -	WSSRAP	Chemical Plant	EX2010102	500	6.550	8.741	
OR-7306- -	WSSRAP	Vicinity Properties	EX2010102	41	600	195	
OR-7307- -	WSSRAP	Disposal Facility	EX2010102	8.000	4.500	9.318	
OR-7308- -	WSSRAP	Studies	EX2010101	-50	2.250	2.845	
OR-7312- -	WSSRAP	Environmental Survey & Site	EX2010102	0	0	73	
OR-8301- -	OR-DIRECT	DOE Direct	EX2010301	442	1.169	1.604	
OR-8301- -	OR-DIRECT	DOE Direct	EX2010302	0	0	3.155	
OR-8301- -	OR-DIRECT	DOE Direct	EX2010304	0	0	88	
OR-8303- -	OR DIRECT	Contract Management Support	EX2010301	1.175	2.370	0	
OR 8304- -	OR DIRECT	Technical Integration	EX2010301	1.643	1.518	0	
OR-8351- -	OR-DIRECT	Waste Management	EX2010202	0	0	431	
OR-9302- -	ORR	Watts Bar Reservoir	EX2010301	2.116	578	0	
N.OR.ND&D				81.578	83.497	96.142	Remedial Action
N.OR.UMTRA-S							
N.OR.UMTRA-S				0	0	0	
N.OR				167.508	168.671	192.591	
N.RL.D&D							
N.RL.D&D				0	0	0	
N.RL.ND&D							
N.RL.ND&D				0	0	0	
N.RL				0	0	0	
N.SF.COMPLIANCE							
N.SF.COMPLIANCE				0	0	0	
Oakland - Non-Defense							
N.SF.D&D							
SF-1484-02-	GA	Hot Cell Facility D&D Project	EX2010402	1.396	2.503	2.945	
SF-1484-03-	GA	Hot Cell Facility Program Manag	EX2010401	0	497	655	
SF-1484-03-	GA	Hot Cell Facility Program Manag	EX2010402	434	0	0	
SF-1485-02-	UC DAVIS	D&D - UC Davis	EX2010402	0	743	904	
SF-1485-02-	UC DAVIS	D&D - UC Davis	EX2010404	115	0	0	
SF-1486-02-	GE	Hot Cell/Glove Box Decontaminat	EX2010403	0	50	85	
SF-1486-03-	GE	Hot Cell/Glove Box D&D - Progra	EX2010401	0	55	20	
SF-1488 20-	SSFL (ETEC)	ETEC-D&D	EX2010402	891	1.349	1.813	
SF-1488 20-	SSFL (ETEC)	ETEC-D&D	EX2010403	0	17	0	
SF-1489-11-	GTF	Groundwater and Soil Remediatio	EX2010403	0	0	80	
SF-1489-12-	GTF	Program Management	EX2010402	0	0	20	
N.SF.D&D				2.836	5.214	6.522	D&D

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ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST
N.SF.ND&D						
SF 1482-11-	LBL	Soil and Groundwater Environm	EX2010201	2.572	2.248	1 266
SF-1482-11-	LBL	Soil and Groundwater - Environm	EX2010202	0	555	756
SF-1482-11-	LBL	Soil and Groundwater - Environm	EX2010204	400	58	28
SF-1482-12-	LBL	Closure Hazardous Waste Handlin	EX2010201	0	500	0
SF-1482-12-	LBL	Closure Hazardous Waste Handlin	EX2010202	0	0	659
SF-1482-31	LBL	Program Management	EX2010201	613	654	383
SF-1482-31-	LBL	Program Management	EX2010202	0	132	575
SF-1482-31-	LBL	Program Management	EX2010204	87	13	9
SF-1483-10-	SLAC	SLAC Assessment & Remediation	EX2010101	455	469	745
SF-1483-10-	SLAC	SLAC Assessment & Remediation	EX2010104	288	23	0
SF-1483-30-	SLAC	SLAC Program Management	EX2010101	202	250	250
SF-1485-01-	UC DAVIS	Soil & Groundwater LEHR	EX2010101	2 607	0	0
SF-1485-01-	UC DAVIS	Soil & Groundwater-LEHR	EX2010102	0	2.361	2.679
SF-1485-03-	UC DAVIS	Program Management	EX2010301	750	673	797
SF-1487-01-	SF-DIRECT	Contractor Support	EX2010301	0	0	690
SF-1487-02-	SF-DIRECT	Contractor Support & State Gran	EX2010301	802	750	266
SF-1488-10-	SSFL (ETEC)	ETEC - Remedial Action	EX2010201	173	393	0
SF-1488-10-	SSFL (ETEC)	ETEC - Remedial Action	EX2010202	229	157	740
SF-1488-10-	SSFL (ETEC)	ETEC - Remedial Action	EX2010301	1 093	1.491	160
SF-1488-30-	SSFL (ETEC)	Program Mgmt - Support	EX2010301	470	616	500
N.SF.ND&D				10.741	11.343	10.503
N.SF				13.577	16.557	17.025

Remedial Action

Savannah River - Non Defense

ADS NUMBER	INSTALLATION	TITLE	B&R	FY95 CONGRESS REQUEST	FY96 CONGRESS AMENDED	FY97 CONGRESS REQUEST
N.SR.D&D						
SR- 608-AA-	SAVANNAH RIV	B-Area	EX2010403	292	4.300	4.300
N.SR.D&D				292	4.300	4.300
N.SR.ND&D						
N.SR.ND&D				0	0	0
N SR				292	4.300	4.300
N SUBTOTAL				386.396	361.377	358.239
GRAND TOTALS				2 357.103	2.444.236	2.360.633

D&D

ENVIRONMENTAL RESTORATION

Mr. Myers. Approximately 27% of the funding identified for Albuquerque environmental restoration activities is for program management support activities. This seems particularly exorbitant since it does not include the cost of the federal employees in Albuquerque who are supposed to be managing these programs. Please provide a detailed description of all activities and funding requested for technical assistance, program management support, and ADS preparation and data management activities, including the name of the contractor performing the services and the costs for these activities in fiscal years 1995, 1996, and 1997. How do the program management costs for Albuquerque projects compare to program management costs of other sites?

Admiral Guimond. The Department agrees that the costs for Albuquerque program management activities are higher than comparable private industry, and higher than they should be. Getting these costs under fiscal control are part of the bigger problem of controlling support costs in general, as compared to mission-direct costs. Since January 1994, Albuquerque has taken specific, concrete steps to reduce program management costs. Specifically, facility action plans were prepared for the three largest Albuquerque installations that included requirements to reduce program management costs by significant percentages of the annual budget, under risk of alternative contracting arrangements being made if the requirements were not met. Ratio goals of between 20 to 25 percent of the annual budget have been stipulated as a worst case with incentives to substantially exceed this target.

Several core activities are included in program management costs for Albuquerque. For the record, I would like to provide a list of those activities, as well as the costs for program management activities and percentage of total funds in fiscal years 1995, 1996, and 1997.

The contractors performing the services include: Los Alamos National Laboratory/University of California; Kansas City Plant/Allied Signal; Sandia National Laboratories/Lockheed Martin; and Pantex Plant/Mason Hanger and Battelle.

(The information follows):

CORE ACTIVITIES AT ALBUQUERQUE

- project administration (e.g., procedures, administrative record, property)
- project controls (e.g., baselines, change control)
- reporting (e.g., Progress Tracking System, Monthly reports)
- meetings and presentations
- audits and assessments
- community relations and public participation
- planning
- site-wide activities (e.g., Geographic information systems, hydrologic characterization)

- NEPA
- Quality assurance and compliance (e.g., DOE Orders, regulations)
- technology development and data base management

ALBUQUERQUE OPERATIONS OFFICE
ER PROGRAM MANAGEMENT

ACTIVITY	DESCRIPTION	CONTRACTOR	FY 1995	FY 1996	FY 1997
TECHNICAL ASSISTANCE	Provides project baseline support.	Rust Geotech	$ 3,431	$ 2,834	$ 500
	Provides framework studies, pilot studies, alluvial well monitoring, and sample management.	University of California	15,762	3,240	1,800
	Provides subproject technical reviews, records management, community relations, and technology applications.	Sandia Corporation	2,537	1,920	1,725
PROGRAM MANAGEMENT	Provides internal management, project oversight, baseline management, and technical support.	Allied Signal	1,731	1,876	1,770
	Provides general and administrative management, program planning, baseline management, coordination of public and stakeholder involvement, and technical document review.	Mason Hanger/ Battelle	4,608	2,674	2,701
	Provides project management, baseline management, project-wide documentation, health and safety coordination, and public involvement.	University of California	21,724	12,961	7,491
	Provides site-wide project management, quality control, administrative support, and baseline management.	Sandia Corporation	3,305	3,584	3,707

	Provides site-wide project management, technical support, regulatory compliance documentation, and public participation coordination.	Lovelace	748	500	310

ENVIRONMENTAL RESTORATION

Mr. Myers. Provide the same information as above for Idaho and Nevada program management type activities.

Admiral Guimond. The Program Management Support activities for the Idaho Operations Office are approximately 13% of the FY 1997 budget request to Congress.. The following table identifies the funding for Idaho National Laboratory Program Management, DOE Support Contracts and Grants. The DOE support contracts include Jason Corporation, Ecology and Environment, Advanced Sciences, Inc., and Science Applications International Corporation: ($ in thousands)

INEL PROGRAM MANAGEMENT FUNDING	FY-1995 Actual Cost	FY-1996 Planned Cost	FY-1997 Cong. Request
1. LITCO Program Management (includes Parsons)	12,943	12,232	9,896
2. DOE Support Contracts	3,700	3,212	2,561
3. Grants (State of Idaho/Shoshone Bannock Tribe)	1,857	1,805	1,800
Total Program Support	**18,500**	**17,249**	**14,257**
Total ER Program	**104,830**	**105,567**	**109,259**
Program Management Support % of Total	**18%**	**16%**	**13%**

The Idaho Operations Office Program Management Activities are detailed below:

DOE Program and Technical Administration and Oversight:

- The role of the DOE Waste Area Group (WAG), Project, and Program Manager is to provide regulatory oversight for all projects covered in the Federal Facility Agreement and Consent Order (FFA/CO) and decontamination & decommissioning (D&D). Interfacing with the State of Idaho and Environmental Protection Agency provides the oversight for technical adequacy of all environmental restoration projects.

- The Program Manager serves as the primary contact for purposes of implementing the FFA/CO; approves and signs No Further Action Determinations; and evaluates and approves changes to operable units. Coordinates with HQ Program Manager on programmatic budget and resource allocation, and technical decisions.

- The WAG and project managers manage remedial activities to ensure cost-effective, technically effective decisions, in compliance with applicable laws and regulations.

Lockheed Martin Idaho Technologies Co. (LITCO) Planning Year (FY 1997) Description:

Continuation of program implementation responsibilities as defined below.

- PROGRAM FORMULATION includes: updating Environmental Restoration (ER) Major System Acquisition (MSA) long-range plans, supporting MSA cost schedule and technical baseline development, evaluating emerging technologies, establishing/revising resource requirements, and updating the cost estimating handbook and cost capture procedures.

- ADS PREPARATION AND BUDGETING includes: Preparation and issue of control account planning guidance, providing cost estimating review of cost bases and assumptions for control account plans, MSA baseline preparation and issue of prioritization guidance, establishment of program priorities, and preparation of ADS documents.

- PROGRAM EXECUTION: MANAGEMENT SYSTEMS POLICIES, PROCEDURES includes: Preparation and revision of management plans, establishment and revision of organizational policies and procedures, policy, and procedure training.

- PROJECT CONTROL SYSTEMS (PCS) includes: Upgrading PCS requirements to meet applicable DOE Orders, implementing PCS requirements and evaluating performance, monitoring and administering management reserve funds, and implementation of control system upgrades.

- BASELINE DOCUMENTATION MAINTENANCE includes: Overseeing control account management practices configuration management activities via MSA baseline, control account plans, work packages, milestone logs, and change control activities.

- DATA AND CONFIGURATION MANAGEMENT includes: Maintaining Environmental Restoration Information System (ERIS), Integrating Environmental Data Management System (IEDMS), maintaining administrative record files, providing analytical technical support via sample management office, and providing document control and records management.

- COMMUNITY RELATIONS includes: Coordination of public involvement activities, updating the INEL Community Relations Plan, and implementation of DOE-ID Public Participation Plan.

- PROGRAM EVALUATION includes: Preparation and issuance of various periodic status/performance and Project Tracking System (PTS) reports, providing self-assessment reports, performing line management reviews of monthly self-assessment report, and annual self-assessment plan(s) and responding to periodic cost estimating, budget, and financial reviews and audits.

- QUALITY ASSURANCE MANAGEMENT includes: Establishing and revising procedures and Quality Program Plans (to meet requirements), establishing and revising the organization's current understanding of ES&H, quality drivers and requirements (via laws, DOE orders, federal/state/local agreements, company procedures, etc.), training and qualifying Quality Assurance (QA) staff, monitoring compliance, and providing QA support and interface with program managers/control account managers/engineers during development of program related deliverables.

Program Coordination including coordination of technical and programmatic activities as required to implement the objectives of the INEL FFA/CO and D&D projects including:

- TECHNICAL COORDINATION includes: Guidance and strategy for implementation of FFA/CO requirements at individual Waste Area Groups (WAG), review WAG specific technical, planning, and budgeting documents, and other assistance to DOE in WAG related planning. Also includes general technical support of non-WAG specific requirements, NEPA, Agency for Toxic Substances and Disease Registry (ATSDR), & Natural Resource Damage Assessment (NRDA), coordination, development, support of D&D projects, development of technical guidance & procedures documents.

- PROGRAM COORDINATION includes: development and monitoring of Environmental Restoration program baseline, support of DOE led surveillance, audits, and self-assessments, support of DOE-ID on HQ or EPA/State actions related to program management, serving as secretary of the DOE change control board and reviewing change control proposals, supporting DOE in life cycle planning ADS development, development of programmatic guidance, preparation of DOE monthly reports to DOE-HQ, EPA, and the IDHW, coordination of quarterly reviews, and preparation of monthly PTS inputs.

NEVADA OPERATIONS OFFICE
Program Management Costs
(Dollars in Thousands)

	Actual Cost FY 1995	Planned FY 1996	Planned FY 1997
M&O Contracts	$ 959	$ 937	$ 600
Environmental Restoration Contracts	4,636	5,048	3,655
Other	86	0	0
Total Program Management	$5,681	$5,985	$4,255

For fiscal year (FY) 1996, Program Management Support funding for the Environmental Restoration program at Nevada is $6.0M, or 12.5% of the $47.9M program. Included in the $6.0M are all Program Management Support for environmental restoration on the Nevada Test Site and Tonopah Test Range, and eight off-site test areas in five states managed by the Nevada Operations Office. Program Management Support includes funding for administrative support, overall project planning, budgeting (including ADS development), scheduling, execution, tracking, and reporting; program-wide quality assurance, and health and safety programs; community relations, and program-wide National Environmental Policy Act requirements such as the draft site-wide Environmental Impact Statement for the Nevada Test Site which is currently out for public comment. Salaries for federal employees are not included in this amount. In FY 1996, contractors supporting this work are IT Corporation and Bechtel Nevada. In FY 1995, the percentage of Program Management Costs was higher: 14.7%, but out of a smaller program of $38.9M. In contrast, for FY 1997, Program Management Support costs are projected to be about 8% (grants and AIPs excluded) of the Congressional Request of $53.2M. Overall, while the size of its program has been growing between FY 1995 to 1997, the percentage of Nevada's budget for environmental restoration Program Management Support has been declining.

ENVIRONMENTAL RESTORATION

Mr. Myers. What is the amount of the DOE contribution for the South Valley Superfund Site?

Admiral Guimond. The Department of Energy contribution in fiscal year 1995 was $1,636; in fiscal year 1996 it is $986,000; and in fiscal year 1997 it will be $576,000.

ENVIRONMENTAL RESTORATION

Mr. Myers. How many federal employees are in the DOE-RMI Decommissioning Project office; what are their job titles; and what is the total cost of operating this office in fiscal years 1995, 1996, and 1997?

Admiral Guimond. The RMI site in Ohio has four DOE employees: an Area Office Director; a Deputy Office Director; a facility representative; and a secretary.

The total operating costs for this office for Fiscal Year (FY) 1995 were $355,000. Operating costs include salaries, benefits, training, transportation, and capital equipment costs for the four DOE employees. The FY 1996 and FY 1997 support costs will remain substantially the same. Support costs do not include office space allocation, which has been provided by RMI.

ENVIRONMENTAL RESTORATION

Mr. Myers. How much funding is included for fiscal years 1995, 1996, and 1997 for technical support services contractors to review RMI activities?

Admiral Guimond. Funding for technical support services contractors for Fiscal Year 1995 was approximately $543,000. Funding for technical support services contractors for FY 1996 is approximately $350,000, and $359,000 for FY 1997.

ENVIRONMENTAL RESTORATION

Mr. Myers. The large projects such as FUSRAP and Grand Junction projects under this account seem to have no end date or cost estimates for completion, and they appear to be administered under cost-plus fixed fee contracts. What steps are you taking to accelerate cleanup of these projects, reduce the costs, and find creative ways to do both?

Admiral Guimond. The Formerly Utilized Sites Remedial Action Project (FUSRAP) currently has a total cost and schedule baseline that projects program completion in 2016, at a cost of $2.5 billion. FUSRAP is actively pursuing means to implement protective solutions which cost less. Working in collaboration with our stakeholders, the Department is working to adopt cost-effective remedies at our larger sites, to reduce costs and improve the program's baseline. These "smarter" solutions may incorporate treatment or in-place remedies rather than simple excavation and disposal. Alternative solutions incorporate realistic cleanup standards that are based on realistic future land use scenarios. Additionally, the Environmental Management Advisory Board (EMAB) has established a committee which is reviewing FUSRAP. This committee is actively developing principles which support initiatives for "smarter" cleanup solutions. The Department anticipates that these "smarter" solutions for cleanup of the FUSRAP sites will enable the Department to reduce the time and cost of remediation, thereby accelerating cleanup of the sites and completion of the FUSRAP program

The three large projects being performed by the Grand Junction Projects Office are the Monticello Remedial Action Project (MRAP), the Grand Junction Project Office Remedial Action Project (GJPORAP), and the Uranium Mill Tailings Remedial Action Ground Water Program (UMTRA GW). MRAP and GJPORAP are part of the EM-40 Small Sites Strategy and are scheduled for completion by the year 2000. The UMTRA GW will grow from its present funding level of $7 8 million to approximately $28 million per year by the year 2000 and is scheduled for completion in 2014. The smaller Long-Term Surveillance and Maintenance Program (LTSM) and the Uranium Leasing Program (UL) have been developed in response to requirements of the statute. The LTSM Program cannot be accelerated because the Department is committed to the long-term care of off-site remedial action projects; therefore, this program has no termination date. The UL Program was recently extended for 10 years, partially in response to a stronger market for uranium. The Department is moving forward with a procurement to select two small business set-aside contracts for the operation of the Grand Junction Projects Office beginning July 1996. The Department of Energy staff at Grand Junction will work with the new contractors to develop more efficient and cost effective ways to perform the missions assigned to them.

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[a] Cross-Cutting Activities.

[b] Includes funding for Program Direction Budget.

[c] Includes $185,000 in Privatization funding.

[d] Rocky Flats funding included in EM-45.

[e] Interns are located throughout the DOE complex but are counted against Headquarters for personnel purposes.

ENVIRONMENTAL RESTORATION

Mr. Myers. Why haven't these contracts been converted to performance based contracts?

Admiral Guimond. The contract vehicle for the prime FUSRAP contractor is, indeed, a cost plus fixed fee contract. However, competitive, performance based or fixed-price subcontracts serve as the principal contract vehicle for actual site remediation activities and waste disposal. In FY 1996, 61% of payments to the prime contractor were applied to one of these subcontracts. FUSRAP also has continued to reduce prime contractor costs through improved contract management practices. Reductions have been generated through a rigorous evaluation and negotiation of the annual work plans. These work plans define the allowable amount of labor to be used to complete specific and required actions within the annual plan. Additionally, the Environmental Management Advisory Board (EMAB) has established a committee which is reviewing FUSRAP. This committee is actively developing principals which support initiatives for "smarter" cleanup solutions.

The Grand Junction Project Office presently operates under a cost-plus award fee contract. The two new contracts scheduled to be awarded in July 1996 will be performance based.

ENVIRONMENTAL RESTORATION

Mr. Myers. What is the estimated cost and date for completing the Grand Junction project?

Admiral Guimond. The Monticello Remedial Action Project and the Grand Junction Projects Office Remedial Action Project are scheduled for completion in FY 2000, at estimated total project costs of $221 million and $45 million, respectively. The UMTRA Ground Water Program will be complete in 2014 at an estimated cost of $540 million. We are in the process of reevaluating the UMTRA Ground Water Program strategy and we believe there are opportunities to reduce the estimated cost significantly. The Long-Term Surveillance and Maintenance Program will continue indefinitely at a level of about $2 million per year in the near future and the Uranium Leasing Program will be about $500 thousand per year over the next 10 years. Waste management activities at the Grand Junction Projects Office will be about $1.8 million per year over the same time period. The program management support and landlord costs will average about $10 million per year through the year 2000.

ENVIRONMENTAL RESTORATION

Mr. Myers. What are the annual costs for fiscal years 1995, 1996, and 1997 associated with each of the individual items included in the activity data sheet of the budget?

Admiral Guimond. I would like to provide the following information for the record.

GRAND JUNCTION PROJECT OFFICE FUNDING
(Dollars in Thousands)

	FY 1995	FY 1996	FY 1997
Monticello Remedial Action Project	22,583	32,635	33,740
Grand Junction Project Office Remedial Action Project	1,596	3,300	5,050
Uranium Mill Tailings Remedial Action Groundwater Program	7,000	7,800	7,800
Long Term Surveillance and Maintenance Program	766	929	1,435
Uranium Leasing Program	353	300	900

ENVIRONMENTAL RESTORATION

Mr. Myers. Provide the annual costs for fiscal years 1995, 1996, and 1997 associated with each of the individual subprojects included in the activity data sheet of the budget for the Weldon Spring project.

Admiral Guimond. I would like to provide the following information for the record.

WELDON SPRING FUNDING
(Dollars in Thousands)

Subproject/ ADS #	Title	FY95	FY96	FY97
OR-7301	Project Integration	17,145	24,250	23,498
OR-7302	Support Facilities	5,067	8,550	12,972
OR-7303	Quarry	7,600	4,650	2,693
OR-7304	Raffinate Pits	3,100	7,150	7,165
OR-7305	Chemical Plant	500	6,550	8,741
OR-7306	Vicinity Properties	41	600	195
OR-7307	Disposal Facility	8,000	4,500	9,318
OR-7308	Studies	150	1,400	2,845
OR-7312	Environmental Survey	0	0	73
Total		$41,403	$58,500	$67,500

ENVIRONMENTAL RESTORATION

Mr. Myers. How will you guarantee that UMTRA (surface project) program activities are completed by 1998 at the end of the authorized program?

Admiral Guimond. As of March 1996, the UMTRA Surface Project is on track to be completed by the end of fiscal year 1998 although under current law the program is terminated at the end of fiscal year 1996. Of the 24 designated sites, we have completed cleanup of 16 inactive millsites; and work is under way at 6 sites, two of which will be completed this summer. The contract for the final site, Naturita, Colorado, was just awarded, and site cleanup will begin in April. All of these remaining sites will be completed in fiscal year 1997 or early in fiscal year 1998. As I indicated in an earlier response, we do not plan to clean up the two sites in North Dakota because we lack authority to clean up these sites unless the State pays 10 percent of the cost, which the State was informed us it will not do. We agree with the State that the sites pose a low health risk and, we are proceeding to remove the sites from the Project. The final step in the surface project is for the NRC to license the disposal sites. We have worked closely with the Commission and have worked out a schedule to complete licensing by the end of fiscal year 1998.

ENVIRONMENTAL RESTORATION

Mr. Myers. What happens to each UMTRA site as cleanup is completed?

Admiral Guimond. If the tailings were disposed of at the original mill site, the Department acquires the title to the site and assumes responsibility for permanent custody of the site. If the tailings were moved off-site for disposal, the state generally has responsibility for final disposition of the former mill site and DOE has responsibility for the disposal site. Where the former mill site has been acquired by the state and the tailings have been removed, a State has the option to sell the site or retain it for permanent use by the state or another government entity within the state for park, recreational, or other public use. Some sites are currently planned for donation by the states to local governments for recreational use. Of the 24 sites, four (three of which have on-site disposal cells) are on Indian tribal lands and remain under their jurisdiction. Seven sites have disposal cells on site. Two sites were cleaned up under remedial action agreements with the owners, and continue to be privately owned. As the state has not provided its ten percent share, the two sites in North Dakota are not planned to be cleaned up and will be removed from designation under the Uranium Mill Tailings Radiation Control Act. Eight sites are expected to be retained for public use. One site is expected to be sold. After the physical cleanup at a site is completed, the Department works with the Nuclear Regulatory Commission to bring the disposal site under the general license for long-term surveillance and maintenance; and once the site is licensed, it becomes the responsibility of the Long-Term Surveillance and Maintenance Program at the Grand Junction Projects Office. In all cases, DOE will maintain access to the former mill site until compliance with ground water standards is achieved.

ENVIRONMENTAL RESTORATION

Mr. Myers. Describe any activities or responsibilities that the federal government will have for these sites at the end of the cleanup in 1998.

Admiral Guimond. The Department will have two basic responsibilities after the end of UMTRA surface cleanup in 1998: ground water compliance at the sites and long-term surveillance and maintenance. Under the ground water program, the ultimate goal is to achieve compliance with EPA ground water standards at all of the sites through a mix of active and passive restoration techniques. This program is scheduled to be complete by 2014. Under the long-term surveillance and maintenance program, the fundamental responsibility of the Department is to ensure that the disposal sites continue to perform as they were designed to do. The Department has permanent custody and responsibility for each disposal site, except for the three disposal sites on Indian land, where the Department will have access to the sites but not legal custody. The Department will inspect each site on a regular basis, conduct ground water and environmental monitoring as required, and maintain and repair the site as necessary. Routine maintenance, major repairs, or additional remedial action will be performed if the site or cell deteriorates, or if there is failure of the site or if waste materials are detected offsite. This requirement for this program is essentially permanent; i.e., the government's responsibility for these sites will continue indefinitely.

ENVIRONMENTAL RESTORATION

Mr. Myers. List each site included in this program. For each, provide the date when remediation started, the date completed or proposed for completion, the original estimate of the total cost, the current total cost of the project, and the amount funded by DOE and the State.

Admiral Guimond. I would like to provide the following information for the record.

UMTRA SITE INFORMATION
(Dollars in Thousands)

Site	Start Date	Completion Date	Original Estimate	Current Total Cost	DOE Funded	State Funded
Ambrosia Lake, NM	07/87	06/95	$ 40,925	$ 40,196	$ 37,072	$ 3,124
Belfield/Bowman, ND	N/A	N/A	16,455	35,840 *	34,231 *	1,609 *
Canonsburg, PA	10/83	07/87	53,955	47,412	44,386	3,026
Durango, CO	10/86	05/91	52,921	68,352	63,443	4,909
Edgemont, SD (VPs)	08/83	12/88	5,708	5,552	5,078	474
Falls City, TX	01/92	07/94	37,409	57,634	53,855	3,779
Grand Junction, CO	12/88	08/94	277,235	549,896	505,067	44,829
Green River, UT	11/88	12/89	14,927	22,119	21,010	1,109
Gunnison, CO	06/92	12/95	41,287	63,007	59,452	3,555
Lakeview, OR	06/86	10/89	28,936	32,833	30,802	2,031
Lowman, ID	04/91	06/92	16,168	18,916	18,007	909
Maybell, CO	04/95	12/96	23,773	43,378	40,844	2,534
Mexican Hat, UT	09/87	02/95	41,681	55,542	55,542	0
Monument Valley, AZ	08/92	03/94	18,607	24,465	24,465	0
Naturita, CO	05/94	09/97	26,125	67,281	63,609	3,672
Rifle, CO (2 sites)	09/88	05/96	76,039	105,827	97,844	7,983
Riverton, WY	05/88	09/90	53,453	48,812	43,025	5,787
Salt Lake City, UT	01/85	05/89	92,471	92,365	84,586	7,779
Shiprock, NM	10/84	11/86	22,751	23,485	23,485	0
Slick Rock, CO (2 sites)	03/95	12/96	18,287	46,728	43,925	2,803
Spook, WY	04/89	09/89	8,710	10,412	10,054	358
Tuba City, AZ	10/85	05/90	24,637	28,589	28,589	0
TOTALS			$992,460	$1,488,641	$1,388,371	$100,270

* The Department does not plan to cleanup these two sites because we lack the authority to act unless the State pays 10 percent of the cost, which the Staste has informed us it will not do.

The original estimates for the Uranium Mill Tailings Remedial Action (UMTRA) Project were developed in the early 1980's but did not reflect major changes in scope. The estimates were based on the original EPA ground water standards and the assumption that most of the tailings could be disposed of at their original locations.

The information provided above for each of the UMTRA sites references the FY 1990 field budget prepared in March 1988. That budget reflected compliance with revised EPA standards which were proposed in 1987 and which impacted numerous decisions relating to disposal cell site locations and cell design, which, in turn, resulted in increased costs. As a result of the revised standards and stakeholder inputs, designs for compliance with ground water protection standards became more costly, and it became necessary to relocate about half of the sites to more remote locations. Factors that have resulted in increased costs since the FY 1990 budget include increased quantities of tailings and numbers of vicinity properties at some sites, increased costs for worker and public health and safety at the sites, and increased project duration and escalation.

In its December 1995 report, "Uranium Mill Tailings--Cleanup Continues, but Future Costs Are Uncertain", the GAO analyzed cost growth from 1982 to 1995. They concluded that the total cost of the project increased by 37 percent in 1995 dollars. They indicated this was due to the growth in project size and complexity, including increased quantities of tailings and revised ground water standards.

ENVIRONMENTAL RESTORATION

Mr. Myers. Describe the long-term surveillance and maintenance program.

Admiral Guimond. One of the final steps in the licensing process is for the Nuclear Regulatory Commission to approve a Long-Term Surveillance Plan which is prepared by the Department. Basically this plan describes the technical approach for verifying that the cell performs according to its design. The Long-Term Surveillance and Maintenance Program will implement this plan for each UMTRA disposal site.

ENVIRONMENTAL RESTORATION

Mr. Myers. What activities are included in this program and what are the costs of each?

Admiral Guimond. Under this program the Department will conduct annual inspections and routine maintenance at each licensed site and prepare an annual inspection report. Routine maintenance can include mowing the grass, removal of weeds, or repair of minor erosion. Environmental monitoring will be conducted for cell performance, including groundwater. If a major failure is detected or if the site is found to be out of compliance, a corrective action plan will be developed and submitted to NRC for approval, and corrective actions and repairs will be implemented as necessary. Currently the annual costs of these activities are about $25,000 per site. The Long-Term Surveillance and Maintenance program also pays $62,000 annually in fees to the Nuclear Regulatory Commission, which is allocated against all sites. However, we expect that, as the number of sites increases, these costs will be reduced through economies of scale and increased experience.

ENVIRONMENTAL RESTORATION

Mr. Myers. Does the State share in this cost?

Admiral Guimond. No, the states do not share in this cost.

ENVIRONMENTAL RESTORATION

Mr. Myers. Is the UMTRA ground water program authorized to continue beyond FY 1998?

Admiral Guimond. The Secretary's authority to perform remedial action activities for the UMTRA ground water program was granted without time limitation under PL 100-616, an amendment to the Uranium Mill Tailings Radiation Control Act. Current planning reflects project completion in FY 2014.

ENVIRONMENTAL RESTORATION

Mr. Myers. Is it subject to cost-sharing by each state? If so, describe the funding requirement.

Admiral Guimond. State cost sharing is defined in the Uranium Mill Tailings Radiation Control Act (UMTRCA) and applies to the ground water program as well as the surface program. Using the precedent established for cost sharing under the surface program, it is expected that states will continue to share the cost of engineering and design, construction, and field management. Targeted compliance activities at each of the UMTRA sites currently reflect minimal state cost shared activities. Final compliance activities will be determined after the publication of the Record of Decision for the Programmatic Environmental Impact Statement for the Ground Water Project, which is expected in 1996. The total state cost share reflected in the FY 1997 budget for all sites, except those on Indian lands, is $2.529 million against an estimated total project cost of $496.773 million through project completion.

ENVIRONMENTAL RESTORATION

Mr. Myers. Describe the program management support activities in the UMTRA program.

Admiral Guimond. The program management support activities for the UMTRA Project include the following: the National Environmental Policy Act process; site certification (which documents that each UMTRA site has been cleaned up to the Environmental Protection Agency 40 CFR Part 192 standards); site licensing; safety and health program; public information and participation; quality assurance; document control; technical support provided to DOE site managers; and administrative support activities such as baseline management, budget, support of the Baseline Environmental Management Report development, Progress Tracking System data development and input, and preparation of programmatic documents such as annual status reports. It also includes costs incurred by the DOE for computers, rental space, telephones, and document printing by the Government Printing Office. Additionally, the Omnibus Reconciliation Act requires the Nuclear Regulatory Commission to recover its costs associated with work performed in support of their licensees' activities. The DOE, as a NRC licensee, provides payment to the NRC annually for fees attributed to their support of the UMTRA Project. The UMTRA Project also reimburses the states for 90 percent of their costs associated with the Project and the Indian Tribes for 100 percent of their costs associated with the Project. These are also included under program management support.

ENVIRONMENTAL RESTORATION

Mr. Myers. Provide the costs in fiscal years 1995, 1996, and 1997 for each activity.

Admiral Guimond. I would like to provide the following information for the record.

UMTRA ACTIVITIES
(Dollars in Thousands)

	FY 1995	FY 1996	FY 1997
NEPA			
Surface	$ 0	$ 0	$ 0
Ground Water	138	0	0
SITE CERTIFICATION & LICENSING			
Surface	74	41	18
Ground Water	0	0	0
SAFETY & HEALTH			
Surface	1,275	1,697	1,152
Ground Water	143	480	794
PUBLIC INFORMATION/PUBLIC PARTICIPATION			
Surface	*	*	*
Ground Water	317	390	591
QUALITY ASSURANCE			
Surface	*	*	*
Ground Water	688	1,171	1,605
DOCUMENT CONTROL			
Surface	*	*	*
Ground Water	179	236	347
TECHNOLOGY DEVELOPMENT AND TRANSFER			
Surface	38	21	9
Ground Water	1,080	1,328	1,707
TECHNICAL & MANAGEMENT SUPPORT			
Surface	16,076	17,394	15,319
Ground Water	9,498	4,392	9,587
DOE PROJECT OFFICE PROGRAM SUPPORT			
Surface	337	365	89
Ground Water	17	50	100
NRC FEES			
Surface	1,232	1,159	1,159
Ground Water	217	290	290
STATE/TRIBAL COOPERATIVE AGREEMENT REIMBURSEMENTS			
Surface	430	916	536
Ground Water	100	151	145

*Included in Technical and Management Support under Surface.

ENVIRONMENTAL RESTORATION

Mr. Myers. List each individual FUSRAP site and provide the dates for the beginning and completion of cleanup, the original estimate of the total cost, the current total estimated cost, and the annual cost for each including a total for previous fiscal years, and fiscal years 1995, 1996, and 1997.

Admiral Guimond. I would like to provide the following information for the record.

FUSRAP

($1000)

Site #	Site Name / Location	Date Accepted Into Program	Date Completed (Actual/Forecast)	Original Estimate of Total Cost		Current Estimate Of Total Cost		Actual Thru FY94	FY95	FY96	FY97
101	ACID/PUEBLO CANYON, LOS ALAMOS, NM	1974	1982	1,000	(1)	1,491		1,491	-	-	-
102	ALBANY RESEARCH CENTER, ALBANY, OR	1984	1991	4,400	(1)	14,384		14,370	14	-	-
103	ASHLAND 1, TONAWANDA, NY	1984	2001	50,800	(1)	29,876		5,333	334	344	393
104	BAYO CANYON, LOS ALAMOS, NM	1974	1982	500	(1)	721		721	-	-	-
105	CHUPADERA MESA, WHITE SANDS MISSILE RANGE, NM	1974	1984	100	(1)	65		65	-	-	-
106	GRANITE CITY STEEL, GRANITE CITY, IL	1992	1994	2,100	(5)	146		146	-	-	-
107	MADISON, MADISON, IL	1992	2003	3,200	(4)	3,058		-	-	143	13
108	DUPONT & COMPANY, DEEPWATER, NJ	1989	2005	4,400	(1)	10,485		523	-	-	2
109	ALBA CRAFT, OXFORD, OH	1992	1995	6,400	(4)	6,418		2,553	3,862	3	-
110	W.R GRACE & COMPANY, BALTIMORE, MD	1984	2009	85,800	(1)	33,035		147	-	-	-
111	LUCKEY, LUCKEY, OH	1993	2004	99,700	(4)	75,436		27	36	677	3,888
112	PAINESVILLE, PAINESVILLE, OH	1992	2009	147,300	(4)	120,250		24	4	231	4,779
113	B&T METALS, COLUMBUS, OH	1993	1997	3,200	(4)	3,102		43	28	2,891	130
114	KELLEX/PIERPONT, JERSEY CITY, NJ	1977	1981	400	(1)	612		612	-	-	-
115	NIAGARA FALLS STORAGE SITE VP's, LEWISTON, NY	1974	1986	33,000	(1)	32,850		32,850	-	-	-
116	ST LOUIS DOWNTOWN SITE, ST LOUIS, MO	1984	2016	91,000	(1)	462,177		13,371	8,464	4,452	4,591
117	MIDDLESEX MUNICIPAL LANDFILL, MIDDLESEX, NJ	1978	1986	14,300	(1)	7,668		7,668	-	-	-
118	MIDDLESEX SAMPLING PLANT, MIDDLESEX, NJ	1980	2002	48,200	(1)	54,802		26,748	1,560	3,418	2,797
119	NATIONAL GUARD ARMORY, CHICAGO, IL	1985	1988	1,900	(2)	2,261		2,261	-	-	-
120	BAKER BROTHERS, TOLEDO, OH	1993	1996	8,400	(4)	5,635		370	5,154	107	-
122	C H. SCHNOOR, SPRINGDALE,PA	1992	1994	2,400	(4)	2,275		991	1,253	31	-
123	SEAWAY INDUSTRIAL PARK TONAWANDA	1984	2003	26,400	(1)	38,019		3,541	297	-	430
124	ASSOCIATE AIRCRAFT, FAIRFIELD, OH	1993	1995	2,800	(4)	2,955		407	2,514	34	-
125	SHPACK-LANDFILL, NORTON, MA	1980	1997	7,600	(1)	2,367		2,074	36	39	35
126	ALIQUIPPA FORGE, ALIQUIPPA, PA	1983	1994	1,900	(1)	7,209		7,178	24	7	-
127	VENTRON, BEVERLY, MA	1986	1997	20,600	(2)	16,923		3,715	624	4,976	213
128	BLISS & LAUGHLIN STEEL, BUFFALO, NY	1992	1998	1,300	(4)	1,220		45	150	-	488
129	LINDE AIR PRODUCTS, TONAWANDA, NY	1980	2003	23,900	(4)	42,074		8,417	918	6,566	10,131
130	UNIVERSITY OF CALIFORNIA, BERKELEY, CA	1974	1982	100	(1)	97		97	-	-	-
131	UNIVERSITY OF CHICAGO, CHICAGO, IL	1974	1987	300	(1)	1,616		1,616	-	-	-
132	ASHLAND 2, TONAWANDA, NY	1984	1998	26,700	(1)	13,075		4,485	292	14	468
133	CHAPMAN VALVE, INDIAN ORCHARD, MA	1993	1995	2,600	(4)	2,529		470	1,897	162	-
134	ST LOUIS AIRPORT SITE VP's, ST LOUIS, MO	1984	2013	10,600	(1)	156,077		10,596	2,956	8,177	7,938
135	HHM SAFE CO , HAMILTON, OH	1994	1995	1,200	(4)	1,052		135	883	34	-
136	CE, WINDSOR, CT	1994	2002	33,700	(4)	25,929		4	101	454	694
137	WAYNE, WAYNE, NJ	1984	2010	35,600	(1)	166,342		34,362	4,041	5,864	6,060
138	MAYWOOD, MAYWOOD, NJ	1984	2011	113,500	(1)	395,679		41,474	13,148	15,941	15,936
139	COLONIE , COLONIE, NY	1984	2000	32,500	(1)	126,525		59,024	16,506	9,464	19,755
140	LATTY AVENUE PROPERTIES, HAZELWOOD, MO	1984	2007	33,900	(1)	116,021		18,976	3,929	1,479	1,768
141	GENERAL MOTORS, ADRIAN, MI	1986	1995	3,300	(2)	3,128		788	2,188	152	-
142	SEYMOUR SPECIALTY WIRE, SEYMOUR, CT	1986	1993	2,100	(2)	4,373		4,373	-	-	-
143	ELZA GATE, OAK RIDGE, TN	1988	1992	7,900	(3)	7,152		7,152	-	-	-
144	NEW BRUNSWICK SITE, NEW BRUNSWICK, NJ	1990	1997	26,900	(3)	8,307		1,977	321	5,494	515
145	BAKER AND WILLIAMS WAREHOUSES, NEW YORK, NY	1990	1993	4,100	(3)	1,895		1,869	26	-	-
153	ST. LOUIS AIRPORT SITE, ST. LOUIS, MO	1984	2016	25,700	(1)	440,562		13,239	871	1,087	1,091
158	NIAGARA FALLS STORAGE SITE, LEWISTON	1974	2005	67,000	(1)	50,127		7,068	1,671	1,741	956
(oog-chg.r1)				1,110,700		2,600,000	(6)	343,398	74,100	73,982	83,079

(1) April 1986 Project Plan (Projected FUSRAP program completion date of FY2001, Excludes Palos of $2,522)
(2) September 1987 Project Plan (Projected FUSRAP program completion date of FY2002)
(3) April 1992 Project Plan (Projected FUSRAP program completion date of FY2016)
(4) April 1995 Life Cycle Plan (Projected FUSRAP program completion date of FY2016)
(5) January 1993 Estimate (Projected FUSRAP program completion date of FY2016)
(6) The Differences between the original estimate and the current estimate is a result of scope uncertainty, waste disposal costs, remedy assumptions, and escalation.

Response to Question 79 House Appropriations Hearing March 26, 1996

ENVIRONMENTAL RESTORATION

Mr. Myers. For the FUSRAP program, identify how much funding is being spent on technical and administrative support, and how much for actual cleanup for fiscal years 1995, 1996, and 1997.

Admiral Guimond. I would like to provide the following information for the record.

The following table shows the amounts of funding in the FUSRAP program being spent on technical and administrative support and for actual cleanup in the given fiscal years.

FUSRAP CLEANUP
(Dollars in millions)

	FY 1995	FY 1996	FY 1997
Technical and Administrative Support	$11.2	$11.2	$11.2
Cleanup	$62.9	$62.8	$71.9
TOTAL COST	$74.1	$74.0	$83.1

WASTE MANAGEMENT

Mr. Myers. The budget indicates that only 80 to 150 canisters will be processed in the Defense Waste Processing Facility in FY 1997. The design capacity is 500 canisters annually. Is it safer to store waste as a liquid in tanks than to vitrify?

Admiral Guimond. Over the long term, it is safer to vitrify the waste rather than continue to store it tanks. The reason for producing only 80 - 150 cannisters in FY 1997 is the "learning curve" activities associated with startup and initial operation, similar to those of any major industrial facility. It is not likely that we would reach peak operations for approximately 18 months to two years.

WASTE MANAGEMENT

Mr. Myers. What was the cost of DWPF in fiscal years 1995 and 1996?

Admiral Guimond. The cost for the Defense Waste Processing Facility in 1995 was $236M, and the cost in 1996 will be $185M. The costs have been decreasing as startup activities move toward completion and operation of the facility.

WASTE MANAGEMENT

Mr. Myers. What is the annual operating cost for DWPF in FY 1997?

Admiral Guimond. The operating cost for the Defense Waste Processing Facility in FY 1997 is $142M.

WASTE MANAGEMENT

Mr. Myers. What is the incremental cost to process canisters at the design rate?

Admiral Guimond. The design rate of 500 canisters is a "sprint" capacity that cannot be maintained over an extended period of time (i.e., annually) due to the need for equipment maintenance, replacement, and repair. The maximum sustainable production rate of the Defense Waste Processing Facility is 400 canisters per year. The incremental cost to produce a canister at this maximum rate is the cost of additional chemicals for feed preparations facilities as well as treatment and the cost of the canister itself. The cost is approximately $350,000 per canister. This incremental cost number is preliminary based on minimal operating experience and will be re-evaluated after the first year of radioactive operations.

Mr. Myers. Was this a technical or an economic decision?

Admiral Guimond. Selection of maximum production rate was a technical decision that determined the design and configuration of the facility. This decision was made almost 15 years ago and was envisioned to provide sufficient capacity to process all the high level waste within a reasonable time frame.

WASTE MANAGEMENT

Mr. Myers. Provide a detailed breakout of annual operating costs and employees required for the Defense Waste Processing Facility operations at the proposed rate of 80 to 150 canisters per year.

Admiral Guimond. The $142 million of operating costs breakdown as follows:

- $ 17.15 million (radiation protection, environmental protection, quality assurance, regulatory interface, emergency response, etc.)

- $113.59 million (operators, maintenance, production material costs, utilities, engineering, process support, document control, etc.)

- $ 9.14 million (saltstone facility operation including materials, operators, maintenance, disposal vaults, etc.)

- $ 2.06 million (general plant projects such as upgraded ventilation system, and other facility upgrades)

The Department expects the total staffing level dedicated to DWPF to be reduced to approximately 750 employees in FY 1997 and the out-years. This number does not include personnel working at facilities in the remainder of the high-level waste system which includes:

Two tank farms with a total of 51 high-level waste tanks;

- An In-Tank Processing Facility that pretreats the waste prior to transport to DWPF;

- Three high level waste evaporators;

- Saltstone facility;

- Several waste transfer facilities; and

- Tank farm infrastructure facilities.

WASTE MANAGEMENT

Mr. Myers. Please indicate which costs will incrementally increase and how much at the design rate for canister throughput?

Admiral Guimond. During operation, the DWPF will have certain “fixed costs” that will be incurred regardless of material throughput. These include such things as utilities, environmental monitoring, and emergency preparedness. The variable costs will increase in direct proportion to the additional materials needs relative to the amount of waste to be processed. The variable costs are primarily attributable to materials costs, e.g., canisters, process chemicals, and glass frit. Additional materials costs in the tank farms and pretreatment facilities are also included. Currently, this incremental cost is projected to be $350,000 per canister. After more extensive operation and completion of an initial run-in period where production experience is gained this number will be re-evaluated.

WASTE MANAGEMENT

Mr. Myers. Why have project 94-E-602, project management costs increased by 22% since last year? The funding profile has not changed and the data sheet does not reflect any change in the project configuration.

Admiral Guimond. Project 94-E-602, the Oak Ridge National Laboratory Bethel Valley Federal Facility Agreement Upgrade, was originally scheduled to have construction completed in the 4th quarter of Fiscal Year (FY) 1997, according to the FY 1996 Construction Project Data Sheet (CPDS). Congressional cuts to the FY 1996 non-defense budget changed the FY 1997 appropriations for this project from $9,706,000 to $1,106,000. As reflected in the FY 1997 CPDS, the budget cut has led to deferring completion of this project from 4th quarter of FY 1997 to 1st quarter of FY 2000. This deferral has led to increased costs due to escalation and extended construction contractor overhead. As explained in the next paragraph, the FY 1997 Construction Project Data Sheet reflects a $1,100,000 increase in Design and Management Costs, a $1,500,000 increase in Total Estimated Cost (TEC), a two year delay in construction completion, and only a $60,000 increase in Total Project Cost (TPC).

WASTE MANAGEMENT

Mr. Myers. The object class schedule shows federal salaries in this program. What are these costs?

Admiral Guimond. The Program Object Class Summary shows: 1) federal permanent full-time employee costs; 2) federal personnel benefits costs; and 3) travel and transportation costs related to federal employees. The amount appropriated for FY 1995 was $76.126 million and for FY 1996 $97.030 million. The comparable columns in the Object Class show no funding in these areas because the FY 1997 Congressional Budget has consolidated Program Direction funding for Federal employees into one account per Congressional Direction in the FY 1996 Energy and Water Appropriation Conference Report.

WASTE MANAGEMENT

Mr. Myers. What conceptual design reports are being prepared for major facilities in this program?

Admiral Guimond. The following conceptual design reports are being prepared for major facilities in the Waste Management program: the Radioactive Liquid Waste Treatment Facility at Los Alamos National Laboratory; the Waste Handling Facility at Argonne National Laboratory-West; and the Stack Monitoring System Upgrades and Tank Farm Restoration and Safe Operations at the Richland Operations Office.

WASTE MANAGEMENT

Mr. Myers. What is the status of the seamless canister technologies program?

Admiral Guimond. The seamless canister technologies program provided for the acquisition of two deep-drawn canisters that were successfully filled with glass during the Defense Waste Processing Facility Startup Test Program . One canister was subjected to two drop tests to verify compliance with the requirements. In both instances the canister successfully withstood the drop test without breaching. The other canister was sectioned for microstructure analysis, and tensile and corrosion testing. This testing was delayed and is being conducted during similar testing of roll-and-welded canisters. The final results of the testing will be complete by May 1996.

WASTE MANAGEMENT

Mr. Myers. What are the costs/benefits of this technology?

Admiral Guimond. The cost of a conventional, production rolled and welded canister, procured in bulk, is approximately $6,500. The procurement for the two experimental deep-drawn canisters resulted in a purchase cost of over $100,000 each. If purchased in bulk, we assume the cost of the seamless canisters would be substantially reduced.

Currently, the two deep-drawn canisters are undergoing corrosion and materials testing in parallel with the rolled and welded canisters. The final result of the testing will be complete by May 1996. The two deep-drawn canisters did not meet the strict dimensional tolerances imposed on all DWPF canisters. These tolerances stem from requirements imposed by the Department's Office of Civilian Radioactive Waste Management, to ensure the canisters will fit in standard overpack containers used for transportation, storage, and disposal in that program.

The seamless canisters reduce the potential of fabrication quality control problems that can occur during the production of rolled and welded canisters; however, historically these problems have been minimal. The potential benefits of seamless canisters are lower costs and improved quality, though neither benefits have yet been demonstrated. If cost, could substantially be reduced to be competitive with rolled and welded canisters, and tolerances improved, there would be an economic benefit to using this new technology. The corrosion and material test will determine if there is a clear benefit to use these canisters.

WASTE MANAGEMENT

Mr. Myers. Identify all funding for WIPP in fiscal years 1995, 1996, and 1997.

Admiral Guimond. The funding levels for the total program at the Carlsbad Area Office (CAO) that includes the Waste Isolation Pilot Plant (WIPP) and the National Transuranic Program (NTP) in FY 1995, 1996, and 1997 are as shown in the following table that I would like to insert in the record.

CARLSBAD AREA OFFICE
FUNDING LEVELS for FISCAL YEARS 1995, 1996, and 1997
(Budget Authority In Thousands of Dollars)

	FY1995	FY 1996	FY 1997
WIPP	147,459	153,548	146,241
NTP	22,345	24,152	19,710
Carlsbad Area Office Program Direction	5,075	5,540	6,265
TOTAL	**174,879**	**183,240**	**172,216**

Notes:

1. Starting in FY 1995 the Environmental Protection Agency had separate appropriations for its oversight of the WIPP.
2. DOE Headquarters Program Direction to support five full-time equivalants for FY 1995-FY 1997 is estimated at $500,000 for each fiscal year.

WASTE MANAGEMENT

Mr. Myers. Breakout funding by detailed activities, including which funding goes to the WIPP site versus other facilities.

Admiral Guimond. The breakdown of detailed funding levels for the Carlsbad Area Office (CAO) that includes the Waste Isolation Pilot Plant (WIPP) and the National Transuranic Program (NTP) in FY 1995, 1996, and 1997 are as shown in the following table which I would like to insert in the record:

CARLSBAD AREA OFFICE
DETAILED FUNDING LEVELS for FISCAL YEARS 1995, 1996, and 1997
(Budget Authority In Thousands of Dollars)

Program/Participant	Funding (in thousands of dollars)		
	FY95	FY96	FY97
WIPP	**$147,459**	**$153,548**	**$146,241**
Argonne National Laboratory-West	3,005	389	451
Other CAO Institutional	-2,755	3,140	4,069
Environmental Evaluation Group	1,434	1,534	1,748
National Academy of Sciences	0	258	266
Carlsbad Environmental Research and Monitoring Center	0	1,731	4,500
Carlsbad Department of Development Training Center	500	0	500
U.S. Bureau of Land Management	0	30	58
U.S. Bureau of Mines	300	0	0
U.S. Geological Survey	0	101	0
Inhalation Toxicology Research Institute	85	90	93
Idaho National Engineering Laboratory	307	130	86
Los Alamos National Laboratory	6,500	6,529	6,993
Pacific Northwest Laboratory	1,500	3,456	2,088
Sandia National Laboratories	53,950	45,563	31,586
Waste Isolation Division (Westinghouse)	73,750	80,429	85,929
Carlsbad Technical Assistance Contractor	8,883	10,168	7,874
	FY95	FY96	FY97
NTP	**$22,345**	**$24,152**	**$19,710**
Argonne National Laboratory-East	714	86	0
Argonne National Laboratory-West	2,649	2,650	0

Carlsbad Area Office	444	1,403	135
Western Governors' Association	103	735	1,125
Indian Tribes (2)	85	270	300
Southern States Energy Board	105	111	130
New Mexico Emergency Response	371	700	1,100
Hanford	215	100	250
Idaho National Engineering Laboratory	6,380	4,289	1,654
Los Alamos National Laboratory	1,094	1,533	1,654
Lawrence Livermore National Laboratory	175	0	200
Mound	150	0	0
Nevada Test Site	150	0	130
New Brunswick Laboratory	0	30	35
Oak Ridge National Laboratory	2,369	2,150	1,127
Rocky Flats Energy Technology Site	180	996	180
Sandia National Laboratories, New Mexico	768	2,751	1,943
Savannah River Site	300	0	260
Waste Isolation Division (Westinghouse)	3,172	3,397	7,044
Carlsbad Technical Assistance Contractor	2,921	2,951	2,443
SUBTOTAL	$169,804	$17,770	$165,951
Carlsbad Area Office Program Direction	**$5,075**	**$5,540**	**$6,265**
TOTAL	**$174,879**	**$183,240**	**$172,216**

WASTE MANAGEMENT

Mr. Myers. How many contractor and federal employees are funded in each year?

Admiral Guimond. The DOE/DOE contractor full-time equivalents level for Carlsbad Area Office (CAO) including the Waste Isolation Pilot Plant (WIPP) and the National Transuranic Program (NTP) in each of the fiscal years 1995, 1996, and 1997 are as shown in the following table that I would like to insert in the record.

CARLSBAD AREA OFFICE
DOE/DOE CONTRACTOR FULL-TIME EQUIVALENTS (FTEs)
for FY 1995, 1996 and 1997

Program/Participant	FTEs		
	FY95	FY96	FY97
WIPP (Contractor)	**878.3**	**860**	**860.6**
Argonne National Laboratory-West	6	2.3	2.6
Other CAO Institutional	0	0	0
Environmental Evaluation Group	0	0	0
National Academy of Sciences	0	0	0
Carlsbad Environmental Research and Monitoring Center	0	0	0
Carlsbad Department of Development Training Center	0	0	0
U.S. Bureau of Land Management	0	0	0
U.S. Bureau of Mines	0	0	0
U.S. Geological Survey	0	0	0
Inhalation Toxicology Research Institute	0	0	0
Idaho National Engineering Laboratory	3	0.8	0.5
Los Alamos National Laboratory	18	18	19
Pacific National Laboratory	13	22	13
Sandia National Laboratories, New Mexico	128.1	124.3	122.5
Waste Isolation Division (Westinghouse)	649.2	647.5	656.9
Carlsbad Technical Assistance Contractor	61	45.1	46.1
	FY95	FY96	FY97
NTP (Contractor)	**112.7**	**112**	**47.1**
Argonne National Laboratory-East	5	0.4	0

Argonne National Laboratory-West	18.7	18.7	0
CAO	0	0	0
Western Governors' Association	0	0	0
Indian Tribes	0	0	0
Southern States Energy Board	0	0	0
New Mexico Emergency Response	0	0	0
Hanford	1.9	1.2	1.2
Idaho National Engineering Laboratory	31.6	29.5	5.5
Los Alamos National Laboratory	3.6	5.8	5.8
Lawrence Livermore National Laboratory	1.2	0	1
Mound	1.2	0	0
Nevada Test Site	1.2	0	1.2
New Brunswick Laboratory	0	0	0
Oak Ridge National Laboratory	9.5	7	5
Rocky Flats Energy Technology Site	0	6.9	1
Sandia National Laboratories, New Mexico	3.9	13.9	3.9
Savannah River Site	2.4	0	1
Waste Isolation Division (Westinghouse)	14.3	14	14
Carlsbad Technical Assistance Contractor	18.2	14.6	7.5
SUBTOTAL	991	972	907.7
Carlsbad Area Office (Federal)	**63**	**63**	**63**
TOTAL	**1,054**	**1,035**	**970.7**

WASTE MANAGEMENT

Mr. Myers. Please describe the decision to release $20 million to the State of New Mexico last year.

Admiral Guimond. In FY 1995, Environmental Management provided $20M to the State of New Mexico for State Impact Assistance. The funds were made available in the FY 1992 Appropriations Act and were to be provided to the State once the performance assessment phase had been initiated. The State claimed that the performance assessment phase was initiated once the draft Compliance Certification Application was submitted to the Environmental Protection Agency in March 1995. DOE agreed with the State, and with Congressional agreement, obligated the funds in 1995.

These funds are different from those authorized in the WIPP Land Withdrawal Act that authorizes DOE to provide $20M annually in State Impact Assistance to New Mexico beginning with the fiscal year in which the transport of transuranic waste to WIPP is initiated (Sec. 15, P.L. 102-579).

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A June 5, 1995, letter from the Secretary to Governor Johnson of New Mexico states that the funds discussed in the FY 1992 Appropriations Act "are unrelated to the authorization of funding contained in section 15 of the Waste Isolation Pilot Plant Land Withdrawal Act."

WASTE MANAGEMENT

Mr. Myers. Provide a detailed breakout of year of the funding for the National Low-Level Waste program.

Admiral Guimond. The following table, which I would like to provide for the record, provides a detailed breakout of the funding for the National Low-Level waste program.

Program Cost by Fiscal Year (thousands)					
	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997
Greater-Than-Class C	$2,381.8	$1,422.1	$ 644.3	$ 500.0	$000.0
NLLWMP	$4,391.1	$3,742.5	$4,547.4	$4,800.0	$4,958.0
Total	$6,772.9	$5,164.6	$5,191.7	$5,300.0	$4,958.0

NUCLEAR MATERIAL AND FACILITIES STABILIZATION

Mr. Myers. What is the current status of the foreign research reactor spent fuel program?

Admiral Guimond. The "Urgent-Relief" shipments have been completed, and on February 16, 1996, the Department issued the *Final Environmental Impact Statement on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel*. The Department is expecting to issue the Record of Decision in April 1996.

NUCLEAR MATERIAL AND FACILITIES STABILIZATION

Mr. Myers. Provide a breakout of the costs associated with this program for fiscal years 1995, 1996, and 1997.

Admiral Guimond. The program costs associated with the foreign research reactor spent fuel were approximately $5 million for FY 1995. The program costs for fiscal years 1996 and 1997 would be approximately $9 million, and $30 million, respectively.

NUCLEAR MATERIAL AND FACILITIES STABILIZATION

Mr. Myers. What is the total estimated cost of this program?

Admiral Guimond. At this time there has been no decision that the Department will implement a new foreign research reactor spent fuel management program. If a decision is made to implement a new program, the program cost would depend on the alternative selected and the amount of any fee to be charged. The total program cost for the preferred alternative could range from $625 million to $950 million over a 40-year period (including repository costs), of which the United States would pay approximately one-half.

NUCLEAR MATERIAL AND FACILITIES STABILIZATION

Mr. Myers. How much funding is being spent by EM on production-type activities such as processing Pu-238 at Savannah River for NASA?

Admiral Guimond. There is no funding included in the Fiscal Year 1997 budget request for Pu-238 processing at Savannah River. All processing of Pu-238 for NASA, which began in January 1993, is planned to be completed in fiscal year 1996. Additionally, the funding required to pay the incremental operating costs to process the Pu-238 for NASA has been provided by the Office of Nuclear Energy.

NUCLEAR MATERIAL AND FACILITIES STABILIZATION

Mr. Myers. Why is EM paying for that activity?

Admiral Guimond. As explained in the answer to the question above, EM is not paying for that activity.

GENERAL

Mr. Myers. Why is DOE considering keeping both F and H canyons open at Savannah River for reprocessing when analysis shows that F-canyon alone can do the job?

Admiral Guimond. The Savannah River Site (SRS) material stabilization commitments made by the Department in response to Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 94-1 are based on the operation of both F-and H-Canyons. A facility utilization study was completed late last year to evaluate various operational strategies for the canyons. In evaluating the options, our intention is to support the DNFSB's objectives in Recommendation 94-1 as well as to preserve capability for potential future missions. The Department believes that the financial and other resources, such as properly trained personnel, necessary to maintain both of these canyons in a safe condition in the face of very serious budget pressures makes it important that we carefully examine the options.

Based the results of the study, SRS and Environmental Management staffs recommended to the Acting Under Secretary to consolidate chemical separations activities to F-Canyon, and not to startup those portions of H-Canyon currently not operating. The H-Canyon would be placed in standby following removal of nuclear materials. A decision to consolidate would be revised as necessary as future decisions, such as disposition of highly enriched uranium, that could potentially affect canyon operations are made over the next 12 to 18 months

While the proposed consolidation was shown to allow potential cost savings approaching $200 million over the next ten years, it may result in not meeting all the Recommendation 94-1 commitments DOE made to the DNFSB.

After receipt of the facility utilization study and staff consolidation recommendation, the DNFSB wrote the Department expressing their strong concern that the study does not provide sufficient definition of the proposed standby condition for H-Canyon. The DNFSB considers clear definition of the future oprtational status H-Canyon to be part of the implementation of Recommendation 94-1, and they are concerned about the potential shutdown of canyon facilities in light of limited available alternatives and backup facilities to process nuclear materials.

We are currently working to define, in more detail, the technical requirements for the status of H-Canyon facilities during a transition from their current state to a standby condition. We are not yet in a position to make a decision on adoption of strategy to consolidate chemical separations activities to a single canyon, and therefore must continue to maintain our baseline plan for operation of two canyons until a final decision is made on this matter

With regard to potential cost savings by consolidation of activities to F-Canyon, the utilization study shows that such savings would be about $7 million in Fiscal Year 1997 However, the potential savings would likely be lower than that since additional resources would need to be applied to accelerate activities so we could more closely meet our material stabilization commitments to the DNFSB. Furthermore, the potential cost savings identified in the utilization study are contingent on certain cost and staff reduction assumptions that would not be achievable should it be necessary to maintain a higher level of restart readiness for the H-Canyon facilities.

The projected savings approaching $200 million over the next ten years, while significant if it could be realized, represents less than 2% of the total EM funding expected for the site for the same period and he majority of the savings would occur later n the period. Therefore we believe that it would be inappropriate to make a precipitous decision on this issue before fully evaluating all the ramifications of such a change in facility utilization strategy.

NUCLEAR MATERIAL AND FACILITIES STABILIZATION

Mr. Myers. Please explain the logic that makes it consistent to shutdown the reprocessing canyon at Richland (PUREX) and work on other spent nuclear fuel technologies, but maintain the reprocessing canyons at Savannah River.

Admiral Guimond. In October 1990, then Secretary Watkins decided to place the PUREX Plant in standby ". . . while calling for a detailed analytical study of management and/or disposal methods for N Reactor and other fuels at the Hanford Site." Except for a brief cleanout run, operation of the plant had been suspended since December, 1988 and the need to construct a liquid effluent retention facility and environmental compliance issues were expected to delay potential restart until 1993. In the meantime, a program to encapsulate the leaking spent fuel was being implemented to reduce the health and safety vulnerabilities associated with the spent fuel. In March 1992, the Department determined that the PUREX Plant was no longer a viable option for management of the Hanford spent fuel due to the prohibitive cost estimated to upgrade the facility to meet State of Washington permitting requirements, the excessive costs to bring the facility into compliance with Departmental safety requirements, and the estimate that it would take 6 to 8 years and approximately $1 billion to prepare PUREX for further operation. At the Savannah River Site, however, the canyons remained in an operational mode and contained substantial quantities of nuclear materials requiring stabilization before the canyons could be placed in a standby condition. The canyons provided the most viable, quickest, and most cost-effective solution to resolving the health and safety vulnerabilities associated with the spent fuel at the site as indicated in the Interim Management of Nuclear Materials Environmental Impact Statement.

NUCLEAR MATERIAL AND FACILITIES STABILIZATION

Mr. Myers. You have indicated that you are developing alternative technologies to reprocessing. What are those technologies, and how much is budgeted by program and site for each technology in fiscal years 1996 and 1997?

Admiral Guimond. Approximately a dozen potential alternative technologies to reprocessing have been identified and are being evaluated. Those technologies that are still under consideration are direct disposal of intact spent nuclear fuel either in small disposal packages or co-disposed with vitrified defense high-level waste within the waste packages; technologies that physically change the form of the spent fuel (that is, melting and diluting with depleted uranium, pressing with depleted uranium, or dissolving and vitrifying with depleted uranium); and applications of new treatment technologies (that is, electrometallurgical treatment, plasma arc treatment, and the glass material oxidation and dissolution system).

Funding to the Savannah River Site of $6.3 million in FY 1996 and $20 million in FY 1997 has been provided through the Nuclear Materials and Facility Stabilization Program for the development of alternative treatment technologies for the packaging and/or treatment of aluminum-based spent nuclear fuel. The specific technologies to which these funds will be applied will not be determined until after completion of the ongoing evaluation of alternative treatment technologies later this year.

NUCLEAR MATERIAL AND FACILITIES STABILIZATION

Mr. Myers. Please identify all funding provided for FFTF and ETEC by program in fiscal years 1995, 1996, and 1997.

Admiral Guimond. The following table provides funding levels for the Fast Flux Test Facility and the Energy Technology Engineering Center for fiscal years 1995, 1996 and 1997. ($ in thousands)

	FY 1995	*FY 1996*	*FY 1997*
ETEC Defense			
Defense Waste Mangment	$ 0	$ 0	$ 0
Environmental Restoration	700	3,500	1,000
Technology Development	1,475	0	0
TOTAL ETEC DefenseEM	$ 2,175	$ 3,500	$ 1,000
ETEC Non-Defense			
Waste Managment	$ 3,741	$ 1,668	$ 2,908
Environmental Restoration	2,856	4,023	3,213
Nuclear Material and Stabilization	0	1,672	16,146
Site Operations	206	226	182
TOTAL, ETEC Non-Defense EM	$ 6,803	$ 7,589	$22,449
TOTAL ETEC FUNDING	**$ 8,978**	**$11,089**	**$23,449**
FFTF			
Non-Defense Nuclear Materials and Stabilization	$53,694	$44,518	$42,229
TOTAL FFTF FUNDING	**$53,694**	**$44,518**	**$42,229**

PRIVATIZATION

Mr. Myers. The Pit Nine remediation project at Idaho is cited in the discussion of privatization initiatives. However, this project appears to be badly off schedule, and the State and federal regulators are considering penalties up to $10,000 a week for missed deadlines. What is the status of this project?

Admiral Guimond. Overall Design for the Pit 9 project, which is the first project of its kind ever attempted, is at about 90% complete, as compared to 100% required for the Remedial Design submittal. A number of individual design packages are less than 90% complete, due to changes and evolution of the design which are still occurring (e.g. melter off-gas system, boiler water treatment).

Overall construction is about 70% complete. A massive amount of work has been performed: approximately 11,000 cubic yards of concrete and more than 1,500 tons of reinforcing rod have been placed . Over 250 tons of structural steel have been erected. The Treatment Facility is about 75% complete. Offsite support facilities and utilities are about 60% complete. The Retrieval Facility is about 20% complete.

Procurement is approximately 90% complete and the equipment fabrication is approximately 60% complete, nearly all at off-site locations. Most of the equipment is now undergoing operational testing (e.g. 7 of 10 chemical treatment skids are operating at Lockheed Martin Environment Systems and Technologies [LESATs] site in Salt Lake City, 6 of 7 gantry cranes with retrieval systems are being tested in SONSUBs [a subcontractor to LESAT] Houston location.) Equipment installation at the Pit 9 site is about 5% complete.

LESAT provided a draft revised schedule on March 22, 1996 which showed an approximate 10 month delay in meeting the remaining project milestones. LESAT indicated that the projected delay could increase or decrease based on their ability to resolve unexpected problems and difficulties . The INEL team (Lockheed Martin Idaho Technologies Company [LITCO], ID, Idaho Health and Welfare [IDHW] and EPA) is reviewing the proposed schedule, and will discuss impacts and concerns with LESAT during a monthly design review meeting the week of April 8, 1996.

Two primary documents have not been completed and submitted as scheduled; the Department will hold LESAT accountable under the terms of its contract for any penalty assessed and the cost of schedule delays. Stipulated penalties have not been assessed. Penalties may be assessed at a rate of up to $5,000 for the first week and $10,000 for each additional week. IDHW is the lead agency for Waste Area Group 7 (which includes Pit 9) for implementation of the Federal Facility Agreement and Consent Order, and may recommend to the EPA that penalties be assessed. Unless disputed, EPA must assess the penalties as recommended. To date, neither EPA nor IDHW has notified ID in writing of intent to assess penalties for failure to submit a primary document pursuant to the appropriate deadline.

PRIVATIZATION

Mr. Myers. What lessons have you learned to date on this project that may be applicable to other privatization initiatives?

Admiral Guimond. To date, DOE-ID has learned a number of lessons on the Pit 9 project that have been and will continue to be shared with the rest of DOE. Examples of recommendations to date based on lessons learned are in the areas of contracting and management, regulatory involvement and scheduling.

In the area of contracting and management, the following options should be considered: use of phased contracts with decision points; for work that is well defined, use of fixed price contracts with performance incentives and penalties; for work that cannot be well defined, use of cost plus contracts to assure clear definition of contract data rights; direct federal management rather than subcontracting under the M&O; tailoring contract terms and conditions to the privatized activity rather than using boilerplate that may not be relevant; early development of and decision on procurement strategy and contract requirements to help mitigate cost creep.

In the areas of regulatory involvement and scheduling, DOE should work closely with regulators and other stakeholders from the very beginning; DOE should acknowledge that some of the direct DOE control traditionally associated with accomplishing the actual work must be relinquished to contractors; and, schedules should not be more aggressive than necessary.

The following recent examples of Pit 9 Project lessons learned are included for illustration: A positive lesson with the privatization effort is that, with the schedule slip occurring on the Pit 9 Project, the private sector company (Lockheed Environmental Systems and Technologies) is responsible for the cost of the delay, not the taxpayer as would be the case if this were a traditional M&O cost plus project. Another lesson learned on Pit 9 which could improve future privatization projects is assuring tight contract language on responsibility for regualtory fines and penalties and performance to schedule. The language regarding responsibility for fines and penalties and schedule performance in the Pit 9 contract could be improved. A suggestion for future privatization efforts would be to clearly state that all fines and penalties associated with contract performance and regulatory compliance be the responsibility of the contractor providing the service, and possibly tie incentives to performance and schedule.

Pit 9 privatization lessons learned are documented in the U.S. DOE Private Sector Working Group Privatization Resource Document, published in December 1995. DOE-ID has continued to work closely with HQ Program Offices, providing information to support EM privatization efforts. Pit 9 privatization lessons learned information has been specifically requested and provided to Savannah River, Oak Ridge, and Richland sites to support privatization initiatives at those sites. DOE-ID is factoring Pit 9 lessons learned into the current Advanced Mixed Waste Treatment Facility Project procurement presently underway at the INEL. DOE-ID has documented Pit 9 lessons learned in a paper presented at the DOE, EM-sponsored ER-95 Conference, and has documented detailed Pit 9 lessons learned in an internal report completed in November 1995. Early project lessons learned were captured in two documents which were also developed by the INEL M&O contractor in the 1992-1993 time frame.

PRIVATIZATION

Mr. Myers. Please describe the proposed legislation for privatization of facility deactivation which will authorize contractor financing of deactivation projects with the contractor being paid from savings in maintenance costs to the government.

Admiral Guimond. The Department of Energy spends more than $600 million per year maintaining safety systems at our surplus Defense nuclear facilities to ensure that the public and our workers are protected against the radioactive and hazardous materials in these facilities.

If the bulk of this material were removed, i.e., the facilities were "deactivated", the cost of maintaining these facilities could safely be reduced by 90% or more, potentially saving billions of dollars over the long term.

The Department is performing as much deactivation as we can afford given our budgetary restrictions. The challenge that this legislation addresses is putting private sector resources to work deactivating surplus facilities without increasing the Department's annual budget.

The proposal would enable the Department, through legislation, to contract with the private sector for facility deactivation as follows:

> The Department would contract on a fixed-price basis with a private contractor to perform the facility deactivation.
>
> The contractor would utilize for the deactivation from the private sector and perform the deactivation.
>
> The Department would pay the contractor from the annual cost savings resulting from facility deactivation until the contractor is fully paid (about 3 years).
>
> No government funds would be obligated until payment was due to the contractor.
>
> All payments would come from savings in costs resulting from deactivation; no increase in annual budget would be required when compared to the "no deactivation" alternative.

Precedent exists for this approach. Through "shared energy savings" contracts the Department is presently authorized to contract for privately-financed energy-saving projects and pay the contractor from energy savings resulting from the projects.

PRIVATIZATION

Mr. Myers . Please describe the privatization initiative included in the general government section of the President's budget to provide $182 million for future privatization activities.

Admiral Guimond. Under the President's Fixed Asset Acquisition Initiative, $182 million in Budget Authority (BA) is requested for privatization activities for high priority waste treatment projects at several DOE sites (see attached table). This BA is in addition to that included in the Department of Energy Environmental Management (EM) Defense budget request of $185 million for the Hanford Tank Waste Treatment Privatization initiative.

The $182 million is for the following privatization projects:

- Alpha mixed waste treatment at the Idaho National Engineering Laboratory ($77 million)

- Broad spectrum mixed waste treatment at Oak Ridge, Tennessee ($15 million)

- Remote handled transuranic waste at Oak Ridge, Tennessee ($70 million)

- Other projects under development at the Savannah River Site ($20 million)

The BA will allow these projects to proceed with implementation in fiscal year 1997 and will result in substantial budget savings compared to the traditional Department of Energy contracting approach. Both the alpha mixed waste and broad spectrum mixed waste privatization will be capable of treating waste from other Department of Energy sites.

Under EM's privatization approach, private contractors are responsible for the design, permitting, financing, construction and operation of facilities needed to treat EM waste to EM treated waste performance specifications. Privatized contractors are paid by EM when treated waste meeting EM specifications is delivered.

Payoff

Privatizing Operations

Improving Public Sector Efficiency...
with More Private Sector Incentives

Privatization Activities	*FY 1997 Request*	*Asset Acquisition/ Privatization*	*TOTALS*
• Hanford - High Level Waste	$70 million	—	
Low Level Waste	$115 million	—	
	$185 million		$185 million
• Idaho - Advanced Mixed Waste Treatment Project	$7 million	$77 million	$84 million
• Oak Ridge - Mixed Waste Treatment	$15 million	$15 million	$30 million
• Oak Ridge - Transuranic Waste Treatment	$5 million	$70 million	$75 million
• Other Projects	—	$20 million	$20 million
	$212 million	$182 million	$394 million

SITE OPERATIONS

Mr. Myers. Using 1993 as the baseline, what percentage of the DOE-wide goals for pollution prevention as outlined in the budget justification have been met?

Admiral Guimond:To date we have achieved a toxic chemical emission reduction of approximately 20 percent and have increased our affirmative procurement rate for Environmental Protection Agency designated products by 50 percent. Generation rates of hazardous, radioactive, and sanitary wastes are remaining relatively constant, neither decreasing nor increasing. We are placing increased emphasis on our pollution prevention goals to ensure they are successfully achieved by the end of 1999.

The Secretary of Energy will shortly issue DOE-wide Pollution Prevention goals, to be achieved by December 31, 1999. The goals cover the following topics: Emergency Planning and Community Right to Know Act (EPCRA 313) toxic chemicals, radioactive, low-level mixed, hazardous, and sanitary wastes, solid sanitary waste recycling, and affirmative procurement. The goals are primarily intended to reduce newly-generated waste by 50 percent so that we can direct more of DOE's resources to our cleanup mission.

SITE OPERATIONS

Mr. Myers. The Environmental Monitoring Laboratory at the Savannah River Site is proposed to replace what current laboratory and administrative support facilities?

Admiral Guimond. The Environmental Monitoring Laboratory at the Savannah River Site is proposed to replace the laboratory and administrative space available in Buildings 735-A and 735-11A and the administrative space provided by Trailers 735-16A, 773-57A, and 773-58A.

Environmental Monitoring has sized the proposed laboratory to essentially replace these old facilities. Administrative space has been decreased by providing cubicles rather than offices for most employees. The proposed laboratory has a small increase in the number of lab modules to allow compliance with DOE orders that dictate that samples containing different levels of radioactivity should be segregated.

SITE OPERATIONS

Mr. Myers. What is the square footage of existing laboratory and administrative space, and how many employees are housed in each space?

Admiral Guimond. Currently, laboratories are located in A-Wing of 735-A and the west half of 735-11A. Environmental Monitoring occupies 15 laboratory modules in 735-A, with a square footage of 4,400 square feet. In addition, the group has approximately 2,000 square feet of administrative/computer room space in 735-A, A-Wing. Another 17,000 square feet are utilized for support space such as loading docks, electrical/mechanical rooms, and storage rooms. Total square footage in 735-A is 23,400 square feet. Twenty-five employees are housed in 735-A labs or offices.

In Building 735-11A, Environmental Monitoring occupies 14 laboratory modules, with a square footage of 4,000 square feet. The group has approximately 1,000 square feet of administrative space in the building. Another 11,000 square feet are devoted to mechanical rooms, lunch room, storage space, and conference room. Total square footage in 735-11A is 16,000 square feet. Approximately 20 employees are based in 735-11A labs or offices.

Three trailers consist of approximately 4,000 square feet and provide office space for 25 employees in the group.

	Laboratory (square feet)	Administrative (square feet)	# of Employee
Bldg. 735-A	4,400	2,000	25
Bldg. 735-11A	4,000	1,000	20
Trailers	0	4,000	25

SITE OPERATIONS

Mr. Myers. Identify and quantify the specific activities which are anticipated to increase.

Admiral Guimond. The Environmental Monitoring Laboratory will provide continued compliance with environmental protection requirements as detailed in Federal environmental regulations (Clean Air Act, Clean Water Act, Safe Drinking Water Act, state regulations, and DOE Orders). The activities include radiological effluent monitoring, radiological environmental surveillance, non-radiological monitoring and surveillance, and special surveys from Savannah River Site and the surrounding areas to determine the impacts to the offsite population. No increase in activities is anticipated with the new facility.

SITE OPERATIONS

Mr. Myers. What will happen to the current space that will be vacated if a new facility is provided?

Admiral Guimond. The space that will be vacated by the Environmental Monitoring Laboratory in Buildings 735-A and 735-11A will be transferred to the Environmental Technology Section of the Savannah River Technology Center (SRTC). The space can be utilized by this group with no renovation. This group will utilize the space to separate their environmental trace analytical capabilities from their Special Program support for various governmental agencies. The three administrative trailers currently utilized by the Environmental Laboratory will be excessed and disposed.

One or two administrative trailers currently used by the Environmental Technology Section of SRTC will be excessed when personnel are moved into the administrative space in Buildings 735-A and 735-11A.

SITE OPERATIONS

Mr. Myers. What are the closeout costs for the old facilities?

Admiral Guimond. As the space in Buildings 735-A and 735-11A will be transferred to the Savannah River Technology Center, no closeout costs will be accrued. However, the cost to disconnect utilities to the trailers and dispose of the trailers is approximately $9,000 per trailer, for a total of $27,000.

SITE OPERATIONS

Mr. Myers. The Health Physics Site Support Facility at the Savannah River Site is proposed to replace what current laboratory and administrative support facilities?

Admiral Guimond. The Health Physics Site Support Facility at the Savannah River Site is proposed to replace the laboratory and administrative space available in B and C wings of Building 735-A.

The Site Support Facility has sized the proposed laboratory to essentially replace these old facilities. Administrative space has been decreased by providing cubicles rather than offices for most employees.

SITE OPERATIONS

Mr. Myers. What is the square footage of existing laboratory and administrative space, and how many employees are housed in each space?

Admiral Guimond. Currently bioassay laboratories are located in C-Wing of 735-A, and administrative and external dosimetry laboratories in B-Wing of 735-A. Bioassay occupies 3,600 square feet of laboratory space. External Dosimetry occupies 2,700 square feet of laboratory space and 3,700 square feet of administrative space. Total square footage in 735-A is 10,000 square feet. Seventeen employees are housed in these wings of 735-A laboratories and twenty-one employees are in administrative space.

SITE OPERATIONS

Mr. Myers. Identify and quantify the specific activities which are anticipated to increase.

Admiral Guimond. The activities of the Site Support Facility are to measure the possible intake of radionuclides by site personnel. Specific activities include processing of tritium samples (30,000 in FY 95), of actinide-strontium samples (14,700 samples in FY 95), of fecal samples (limited basis), and of Thermo Luminescent Dosimeter (TLD) badges (70,000 in FY 95). It is not anticipated that these activities will increase due to the move to the new facility.

SITE OPERATIONS

Mr. Myers. What will happen to the current space that will be vacated if a new facility is provided?

Admiral Guimond. The space that will be vacated in Building 735-A will be transferred to the Environmental Technology Section of the Savannah River Technology Center. The space can be utilized by this group with no renovation. This group will utilize the space to separate their environmental trace analytical capabilities from their Special Program support for various governmental agencies. An administrative trailer currently used by the Environmental Technology Section will be excessed and disposed when personnel are moved into the administrative space in Building 735-A.

SITE OPERATIONS

Mr. Myers. What are the closeout costs for the old facilities?

Admiral Guimond. As the space in Buildings 735-A and 735-11A will be transferred to the Savannah River Technology Center, no closeout costs will be accrued. As stated in a previous question, the cost to disconnect utilities to a trailer and dispose of it is approximately $9,000.

SITE OPERATIONS

Mr. Myers. By site what are the costs of work force restructuring activities in fiscal years 1995, 1996 and 1997?

Admiral Guimond. The actual costs of work force restructuring activities by site for fiscal year 1995 is provided in the attached chart entitled "Total Work Force Restructuring Costs (Fiscal Year 1995)." A second chart is also attached that lists estimated work force restructuring costs for fiscal year 1996. This chart includes both expenditures already incurred as well as estimates related to announced work force reductions. Further reductions that may be announced over the remainder of the fiscal year may result in additional costs of $40-60 million.

We are currently evaluating work force restructuring cost implications for fiscal year 1997 due to the recent submission of the fiscal year 1997 presidential budget and fiscal year 1998 funding targets, and will provide you with the information when it is available.

TOTAL WORK FORCE RESTRUCTURING COSTS

(Fiscal Year 1995)

By Program

ENVIRONMENTAL MANAGEMENT		WORKER & COMM. TRANSITION		ENERGY RESEARCH		FOSSIL ENERGY		RADIOACTIVE WASTE	
Site	Cost	Site	Cost	Site	Cost	Site	Cost	Site	Cost
Grand Junction	$807,406	Los Alamos	$7,298,800	Princeton	$9,054,000	Bettis	$1,308,366	Yucca Mtn.	$2,314,000
Brookhaven	$2,130,000	Nevada	$8,108,520	USF	$1,200,100	METC	$69,794		
Ross	$251,215	Pinellas	$28,546,400	Argonne	$10,179,270	Elk Hills	$6,835,118		
Fernald	$5,500,000	Mound	$9,534,000	Lawrence Berkeley	$928,000	Casper	$172,386		
Oak Ridge	$2,069,478					PETC	$197,228		
Idaho	$42,504,600								
Rocky Flats	$16,094,017	Rocky Flats	$11,000,000						
Savannah River	$48,726,402	Savannah River	$25,000,000						
Richland	$77,939,000								
Portsmouth	$5,131,747								
Mound	$9,534,777								
SUBTOTALS	$210,688,642		$89,487,720		$21,361,370		$8,582,892		$2,314,000
GRAND TOTAL	$332,434,624								

ESTIMATED FY 1996 WORK FORCE RESTRUCTURING COSTS BY SITE

SITE	COST (in millions)	SOURCE
Richland	$ 8	EM
Savannah River	$23	EM
Nevada	$ 7	WT
Sandia	$ 9	WT
Los Alamos	$ 4	WT
Mound	$ 1	WT
Oak Ridge	$ 7	EM/DP
Pinellas	$ 6	WT
Rocky Flats	$25	EM
Other Sites	$11	Various
Total	$101	

Additional potential restructuring costs during the fiscal year are estimated to be between $40-60 million

URANIUM ENRICHMENT D&D FUND

Mr. Myers. The Pinellas and Mound area offices appear to have a large number of federal employees for sites that no longer have DOE program missions. Why is this large federal presence still necessary?

Admiral Guimond. The Pinellas and Mound area offices have 28 and 40 Federal employees repectively. These employees are needed to address the unique requirements of the safe and speedy cleanup and close down of the Pinellas and Mound sites. Active technical and administrative management of the site is performed by Federal employees, including characterization and management of cleanup of a 740,000 square feet plant at Pinellas and 1.4 million square feet in approximately 140 buildings at Mound, including the removal of nuclear material and hazardous waste. These employees also are actively disposing of thousands of excess personal property items and transferring large numbers of Government records.

The Federal employees also are pursuing several projects aimed at converting contractor jobs and plant technology capabilities to the commercial sector in order to mitigate the costs associated with reductions-in-force. With the assistance of local community reuse and economic development organizations, Federal employees are working to establish new employment opportunities for the communities affected by the close downs.

URANIUM ENRICHMENT D&D FUND

Mr. Myers. How would you rank the importance of the cleanup activities at the former gaseous diffusion plants compared to other environmental management cleanup activities?

Admiral Guimond. The gaseous diffusion plants do not present the most urgent risk of the facilities in the Department of Energy complex as compared to the high level waste tanks at Hanford or plutonium at the Rocky Flats and Savannah River sites. The facilities in Paducah, Kentucky, and Portsmouth, Ohio, are still being used by the United States Enrichment Corporation to produce enriched uranium. The facility in Oak Ridge, Tennessee, ceased production more than ten years ago. The largest building on the site used to produce highly enriched uranium, has been shutdown since 1964. The enormous size of the facilities, 30 million square feet of floor space -the size of 550 football fields, and the radioactive and hazardous constituents including uranium, trichloroethylene, Technetium 99 and polychlorinated biphenyls determine the need for an effective cleanup plan and careful, deliberate implementations. Reduction in the cost of surveillance and maintenance, potential for recovery and reuse of metals, and opportunities to reuse the land and facilities point to the importance of continuing to make progress on the cleanup activities.

Cleanup activities planned for fiscal year 1997 reduce the risk of off-site spread of contaminants in the groundwater and soils and lower the risk of criticality posed by the potential exposure of uranium deposits left in the process equipment at the K-25 site to weather and the elements.

URANIUM ENRICHMENT D&D FUND

Mr. Myers. Are the former gaseous diffusion sites presenting a danger to the public health and safety?

Admiral Guimond. The former gaseous diffusion site (K-25) in Oak Ridge, TN does not currently present any danger to public health and safety. However, significant routine surveillance and maintenance is required to ensure that the large inventory of waste and contaminated material remains safe. Additional resources are needed to make progress to treat and dispose of this waste, and to decontaminate land and facilities so they require lower maintenance costs and to make them available for other uses. The current gaseous diffusion plant sites also present no imminent public health or safety risks.

The principal risk to the public health and safety at the Paducah, Kentucky, and Portsmouth, Ohio, gaseous diffusion plants comes from the migration of contaminated groundwater offsite. The Paducah site has two offsite groundwater plumes which have caused residential well contamination. Currently, municipal water is being provided to residents in the path of these plumes, thereby mitigating the potential public health risk. At the same time, the Department is initiating ground water pump and treat interim actions to mitigate the risk to the ground water.

The Portsmouth site is presently containing contamination on-site through subsurface barriers and groundwater pump and treat systems. These technologies are interim actions, which provide an estimated five to seven years for the Department to assess a final corrective action.

Catastrophic events such as earthquakes or tornadoes at any of the three facilities pose a threat to spread contamination off-site and thus present a risk to the public health and safety.

URANIUM ENRICHMENT D&D FUND

Mr. Myers. If so, what are the most critical cleanup activities at each which must be accomplished to protect public health and safety?

Admiral Guimond. The Paducah site has two offsite groundwater plumes, Northeast and Northwest, contaminated with trichloroethylene and Technetium 99 which present a concern to public health through residential well contamination. Currently, municipal water is being provided to residents in the path of these plumes. As an interim action, the Department installed a groundwater pump and treat facility for the Northwest Plume which employs an air stripping and ion exchange treatment. The operation began in FY95. The FY97 budget request provides for operation of this facility including testing of an innovative iron filing technology for removal of the contaminants. For the Northeast Plume, the existing cooling tower system is being utilized to volatilize the TCE contaminants in conjunction with the normal operation of the diffusion plant by the United States Enrichment Corporation. The FY 97 budget request provides for operation.

The Portsmouth site is presently containing contamination on-site through subsurface barriers. This technology is an interim solution, requiring a final corrective action within the next few years. A passive system of horizontal wells is being used to transport the contaminated groundwater to the treatment system.

Urgent Uranium deposit removal activities at the K-25 site will be complete by FY 2000.

URANIUM ENRICHMENT D&D FUND

Mr. Myers. What is the goal of this program for each of the sites to be cleaned up?

Admiral Guimond. Paducah and Portsmouth GDPs are still currently in operation and the ultimate use is still undecided. K-25 is no longer in use. However, since long-term S&M and institutional controls will continue indefinitely, limiting future uses, it is assumed that all three sites will be used for some type of industrial activity.

URANIUM ENRICHMENT D&D FUND

Mr. Myers. What are the estimated costs and milestones for completion for each of the activities?

Admiral Guimond. The remedial action estimated completion date for K-25 is 2045. The Paducah remedial action estimated completion date is 2040, and the Portsmouth remedial action estimated completion date is 2035.

For the most critical cleanup efforts associated with ground water activities, we estimate cost for construction, operation, and maintenance of the Northeast and Northwest plumes at Paducah are approximately $80 million. Lifecycle costs associated with the Portsmouth plumes and groundwater contamination currently are estimated to be $500 million. Urgent uranium deposit removal activities at the K-25 site will be complete by FY 2000 at an estimated cost of $25 million.

I would like to provide the following listing of site estimated costs for the record.

ESTIMATED COSTS
(Dollars in Millions)

	D&D*	RA*	PM*	WM*	LL*	Total
Oak Ridge	3.2	0.8	0.1	0.1	0.9	5.1
Paducah	3.2	0.8	0.2	0.6	0.0	4.8
Portsmouth	2.8	0.7	0.1	0.3	0.0	3.9
Total	9.2	2.3	0.4	1.0	0.9	13.8

* These are abbreviations for the following:

D&D = Decontamination and Decommissioning**
RA = Remedial Action
PM = Program Management
WM = Waste Management
LL = Landlord

**Excludes disposition of depleted uranuim estimated to be approximately $1.4 billion.

URANIUM ENRICHMENT D&D FUND

Mr. Myers. What is the total estimated cost of the uranium/thorium reimbursement program?

Admiral Guimond. Congress authorized $310 million for the uranium/thorium reimbursement program. Costs identified to date are approximately $270 million, which include past and future reimbursements. This cost figure does not include groundwater remediation at many of the sites. It is likely that the full amount authorized by Congress will be reimbursed by the Department during the life of this program.

URANIUM ENRICHMENT D&D FUND

Mr. Myers. What claims have been paid to date?

Admiral Guimond. I would like to provide the following information for the record.

LICENSEE PAYMENTS
(Exact Dollars)

LICENSEES	FY 1994 PAYMENT	FY 1995 PAYMENT	
Uranium:			
Atlantic Richfield Company		$7,407,054.91	$6,929,478.24
Atlas Corporation		846,150.08	1,032,000.78
Cotter Corporation		289,059.04	423,193.45
Dawn Mining Company		204,629.18	130,946.07
Homestake Mining Company		4,328,513.81	5,512,118.07
Pathfinders Mines Corporation		1,000,608.11	694,304.21
Petrotomics Company		348,908.26	363,423.19
Quivira Mining Company		1,373,417.98	2,840,785.93
Tennessee Valley Authority		2,668,919.29	1,787,836.92
Umetco Minerals Corporation-CO		9,363,390.09	6,272,282.00
Umetco Minerals Corporation-WY		1,938,392.98	1,541,543.70
Western Nuclear, Incorporated		3,599,404.73	2,455,398.03
Thorium:			
Kerr-McGee	7,000,351.53	11,478,964.10	
Total Reimbursements		$40,368,799.99	$41,691,999.69

URANIUM ENRICHMENT D&D FUND

Mr. Myers. What companies are currently being reimbursed in this program?

Admiral Guimond. Because bills are not due from the licensee until May 1, 1996 and reimbursements are paid at the close of FY 1996, FY 1996 reimbursement information is currently not available. Actual cost information for current reimbursement will be made available in September 1996.

URANIUM ENRICHMENT D&D FUND

Mr. Myers. Why have compliance oversight activities more than doubled from $3.2 million to $8.5 million?

Admiral Guimond. The compliance oversight amount identified in the Uranium Enrichment D&D Fund FY 1997 Congressional Budget submittal is incorrect. We apologize for the error. The current estimated state oversight expenses for FY 1997 are approximated at $5.2 million. The balance of the funding shown in the budget request will be reallocated to remediation activities at the gaseous diffusion plants. The increase in funding is necessary to expedite review of various compliance documents by state agencies. Without the increased funding, the changes would be slowed by delays in turnaround by state agencies that lack adequate funding for oversight from state revenues. Funding of state regulatory agencies by regulated entities is a routine practice by private companies.

The compliance funds identified in the FY 1996 column of the budget request reflect only current year (FY 1996) budget authority. The total funding available for the States of Kentucky, Ohio, and Tennessee in FY 1996 includes approximately $3.2 million in budget authority, and approximately $2.0 million in prior year uncosted carryover, totaling $5.2 million for oversight activities. This FY 1996 level is comparable to the current estimated state oversight expenses for FY 1996.

URANIUM ENRICHMENT D&D FUND

Mr. Myers. Please discuss the need for the proposed foreign fee language.

Admiral Guimond. The proposed foreign fee would provide additional funds for cleanup of the gaseous diffusion plants. In addition to providing needed additional funds, the proposed foreign fee would more equitably distribute the costs to those who benefitted from the production of separative work units produced by the facilities. At present, cleanup is being paid through the Uranium Enrichment Decontamination and Decommissioning Fund (Fund) created by the Energy Policy Act of 1992. The Fund is designed to collect $480 million annually, from Domestic Utilities and the government, for fifteen years (to be adjusted for inflation) for a total of $7.2 billion. The Fund is being used to pay the cost of decontamination and decommissioning, remedial action, waste management, and other related efforts at the three gaseous diffusion plants, and Title X reimbursement of uranium and thorium licensees. The Department estimates the future costs of cleanup of the three gaseous diffusion plants to be $15.2 billion in constant fiscal year 1996 dollars: $9.2 billion for decontamination and decommissioning, $4.6 billion for remedial action and waste management activities and $1.4 billion for disposition of depleted uranium. Another $.3 billion will be paid to uranium and thorium licensees for reimbursement of restoration costs associated with sale of materials to the government.

Domestic utilities, which purchased a substantial number of separative work units, are making significant payments to the Fund. However, foreign customers do not currently make payments, even though they purchased 23.6 percent of the separative work units produced from the beginning of the Government's enrichment program until enactment of the Energy Policy Act of 1992. Specific Congressional authorization is needed to more equitably distribute the cost of future cleanup of the gaseous diffusion plants, based on past benefits received.

URANIUM ENRICHMENT D&D FUND

Mr. Myers. What steps are being taken by the Department to work with the authorizing committees which would need to implement this legislation?

Admiral Guimond. The Administration is developing a legislative proposal which will be submitted to Congress in the near future.

GENERAL

Mr. Knollenberg . Considering the following five sites: Hanford, Rocky Flats, Savannah River, Oak Ridge and Idaho. What are the FTEs at the listed sites today?

Admiral Guimond. Listed below are the number of EM employees at each Operations Office as of March 16, 1996.

	#Employees
Albuquerque	249
Chicago	49
Idaho	276
Nevada	62
Oak Ridge	170
Richland	537
Oakland	85
Ohio Field Office	220
Savannah River	570
Rocky Flats	304
METC	15
PETC	2
TOTAL	2,539

GENERAL

Mr. Knollenberg. What does the Department of Energy anticipate the FTEs will be at the end of FY 96? end of FY 97?

Admiral Guimond. The attached spreadsheet entitled "Environmental Management Contractor and Federal FTEs" contains that information for the record. The sites are presently working toward the FY 1997 Federal FTE targets identified in the Department's Strategic Alignment Initiative (SAI). The contractor workforce levels are expected to remain constant for FY 1996. The FY 1997 contractor FTE levels are projected numbers based on the FY 1997 budget request.

Mr. Knollenberg. What is the ratio of "space suits" to "lab coats" to "business suits" in the EM program in the current fiscal year? Last year? Next year?

Admiral Guimond. The attached spreadsheet entitled "Environmental Management Contractor and Federal FTEs" includes the requested ratios for the five largest EM sites. The ratios for all remaining sites have been requested and a complex wide table will be prepared by April 17. (The information follows)

Environmental Management Contractor and Federal FTEs

	Federal				Contractor 5/				Total			
Site	Direct 1/ Clean-up	Direct 2/ Support	General 3/ Support	Total	Direct Clean-up	Direct Support	General Support	Total	Direct Clean-up	Direct Support	General Support	Total
Idaho												
FY 95 Ratios	0%	80%	20%		35%	45%	20%					
On Board As Of 3/16/96	0	222	54	276	858	1,104	491	2,453	858	1,326	545	2,729
	0%	80%	20%		35%	45%	20%		31%	49%	20%	
FY 96 SAI Target (Federal)	0	211	53	264								
Target Distribution	0%	80%	20%									
FY 97 SAI Target (Federal)		196	52	248	729	938	417	2,084	729	1,134	469	2,332
Target Distribution	0%	79%	21%		35%	45%	20%		31%	49%	20%	
Oak Ridge												
FY95 Ratios	0%	0%	100%		40%	35%	25%					
On Board As Of 3/16/96	0	0	170	170	6,775	1,309	2,014	10,098	6,775	1,309	2,184	10,268
	0%	0%	100%		67%	13%	20%		66%	13%	21%	
FY 96 SAI Target (Federal)			163	163								
Target Distribution	0%	0%	100%									
FY 97 SAI Target (Federal)			145	145	5,689	1,116	1,659	8,464	5,689	1,116	1,804	8,609
Target Distribution	0%	0%	100%		67%	13%	20%		66%	13%	21%	
Richland												
FY95 Ratios	0%	0%	100%		40%	38%	22%					
On Board As Of 3/16/96	0	274	263	537	4,607	3,898	2,219	10,724	4,607	4,172	2,482	11,261
	0%	51%	49%		43%	36%	21%		41%	37%	22%	
FY 96 SAI Target (Federal)	0	268	256	524								
Target Distribution	0%	51%	49%									
FY 97 SAI Target (Federal)	0	261	248	509	4,607	3,911	2,234	10,752	4,607	4,172	2,482	11,261

Environmental Management Contractor and Federal FTEs

Site	Federal Direct 1/ Clean-up	Federal Direct 2/ Support	Federal General 3/ Support	Federal Total	Contractor 5/ Direct Clean-up	Contractor 5/ Direct Support	Contractor 5/ General Support	Contractor 5/ Total	Total Direct Clean-up	Total Direct Support	Total General Support	Total
Target Distribution	0%	51%	49%		43%	36%	21%		41%	37%	22%	
Richland Federal And Contractor numbers and mix is subject to fluctuation dependent on the final outcome of privatization and several other factors presently under review												
Rocky Flats												
FY95 Ratios	0%	0%	100%		20%	36%	44%					
On Board As Of 3/16/96	0	24	280	304	985	1,643	1,309	3,937	985	1,667	1,589	4,241
	0%	8%	92%		25%	42%	33%		23%	39%	37%	
FY 96 SAI Target (Federal)	0	24	270	294								
Target Distribution	0%	8%	92%									
FY 97 SAI Target (Federal)	0	20	265	285	830	1,310	1,232	3,372	830	1,330	1,497	3,657
Target Distribution	0%	7%	93%		25%	39%	37%		23%	36%	41%	
Savannah River												
FY95 Ratios	0%	0%	100%		60%	29%	11%					
On Board As Of 3/16/96	0	0	570	570	8,196	3,982	1,431	13,609	8,196	3,982	2,001	14,179
	0%	0%	100%		60%	29%	11%		58%	28%	14%	
FY 96 SAI Target (Federal)	0	0	549	549								
Target Distribution	0%	0%	100%									
FY 97 SAI Target (Federal)	0	0	495	495	8,144	3,426	1,316	12,886	8,144	3,426	1,811	13 381
Target Distribution	0%	0%	100%		63%	27%	10%		61%	26%	14%	

1/ This represents the "Space Suits"
2/ This represents the "Lab Coats"
3/ This represents the "Business Suits"
4/ In FY95 Savannah River was a dual purpose site (Defense Programs and Environmental Management) It is all Environmental Management in FY 96
This accounts for the significant increase in FTEs chargeable to EM
5/ Contractor employment is generally expected to remain at the same level as the 3/16/96 on board strength for the remainder of FY 96
Contractor employment is equal to total contractor employment regardless of company origin

GENERAL

Mr. Knollenberg. What is the department's view as to the optimal ratios to accomplish safe, quick, and cost-effective cleanup?

Admiral Guimond. The Department believes that the EM program will continue to become more cost effective by focusing on cost saving initiatives such as incentive based and fixed price contracts, targeted reductions in support service costs and privatization of projects such as the Hanford waste tanks. As each site has unique missions and environmental challenges, each will utilize a different ratio of support to direct "cleanup" personnel in order to implement these initiatives. We believe that as each site becomes more productive, based on standardized performance measures, the ratio of personnel at each site must necessarily shift toward their optimal ratio in order to meet their respective productivity goals. The Department is comparing its personnel costs for the management element of support costs, which can be compared to similar projects in government and private industry. For example, the project management costs for environmental restoration projects is 6 percent for private industry and 9 percent for average government projects. By contrast, DOE environmental restoration projects arranged 23 percent in 1993 and were reduced to 16 percent in 1995. Although this 1/3 reduction in project management costs is significant, we recognize that we must make at least a comparable improvement in the next year to further reduce these costs. We have several initiatives to achieve this cost reduction.

GENERAL

Mr. Knollenberg. What are your projected time frames for closing out the EM program at the listed sites?

Admiral Guimond. To determine site completion dates for the five largest sites, the Environmental Management program defined program completion to be achieved when only long-term surveillance and maintenance activities remain.

Based upon the definition of program completion described above, the 1996 Baseline Report indicates that the Office of Environmental Management, in general, plans to complete the five large sites earlier than anticipated in 1995:

- Idaho National Engineering Laboratory -approximately 2045
- Oak Ridge -approximately 2070
- Rocky Flats Environmental Technology Site -approximately 2055
- Hanford Site -approximately 2070
- Savannah River Site -approximately 2050

The Environmental Management program plans to spend the majority of life-cycle costs before this point. Expenditure of 90 percent of the life-cycle cost for environmental management activities at the five largest sites will occur by approximately 2040: Idaho National Engineering Laboratory (approximately 2035), Oak Ridge Reservation (approximately 2040), Hanford Site (approximately 2040), Rocky Flats Environmental Technology Site (approximately 2035), and Savannah River Site (approximately 2030).

ROCKY FLATS CONTRACTS

Mr. Knollenberg. I understand that the Rocky Flats performance based contract has been in effect for under a year, but I would like to take a moment and assess how things are going thus far. Please describe the changes that have occurred at Rocky Flats. Specifically, what imporvements in cost and schedule have occurred?

Admiral Guimond. Kaiser-Hill accepted responsibility for the site on July 1, 1995. Since that time, a number of cost and schedule saving accomplishments have occurred, most of them facilitated by the new contract structure. Kaiser-Hill has:

- Addressed the urgent risks reflected in our committments to the Defence Nuclear Facility Safety Board either on or ahead of schedule. This includes such actions as drum venting and the disposition of highly enriched uranium solutions and thermal treatment of unstable plutonium compounds;
- Developed and started implementing a plan to privatize the site and potentially shave more than $10 billion and 40 years off the previous site closure schedule;
- Restarted nuclear operations and achieved substantial progress in liquid and solid special nuclear materials (SNM) stabilization and consolidation which greatly reduces risk;
- Remediated one of the top EPA-identified Superfund hazardous waste sites at Rocky Flats years ahead of schedule; and
- Provided excellent analytical support in recrafting the site regulatory agreement to achieve substantial cost and schedule savings over the previous agreement.

In summary, according to DOE's own accounting guidelinesm, more than $50 million has been cut from the site baselines costs and equal or greater productivity over the previous contractor has been achieved.

GENERAL

Mr. Knollenberg. What problems have been encountered in moving to an incentive based Management and Integrating contract instead of an award fee, cost reimbursable Management and Operating Contract?

Admiral Guimond. The Department has encountered only relatively minor problems thus far. We believe the tangible benefits of accelerating actions and reducing costs will far outweigh the startup problems following the brief transition period. Because we are in the early stages of the new contracting approach, however, it is difficult to comprehensively assess problems or benefits. It is too early to draw final conclusions regarding the success or failure of the new contracting approach. These contracts must be in place for a longer period before we can fully evaluate what is and is not working. Some problems have surfaced from the new contracting approach, ranging from a difficulty in accurately developing performance measures that best reflect the scope of work of each task and that relate directly to the incentives, to retraining DOE employees in areas such as cost-estimating and cost-engineering that performance-based contracting requires.

Some dramatic performance improvements resulting in much lower costs are already occurring in areas incentivized by fee, such as lower indirect costs and reduced characterization and assessment study expenditures. We are increasing the use of incentives that are results-oriented and focus contractor fees on measurable performance and away from fee guarantees whenever possible, and we are establishing a more direct relationship between fee earned and benefit to the government. The Department is attempting to better integrate "best practices" into the normal work course and continually improve our approaches, techniques, and practices for both contract formulation and contract administration. I am confident that we have embarked on a course of action that will make our contracting more cost-effective and our contractors more efficient in their work efforts.

GENERAL

Mr. Knollenberg. With this type of contractual arrangement, do we need fewer Feds in the field overseeing the contract?

Admiral Guimond. At this early stage of implementing performance-based contracting, we are assigning additional resources to contract oversight even though the total staff at the Operations/Field Offices is declining. One positive aspect of the Department's Strategic Alignment Initiative is the better definition of Headquarters and Field roles, including focused contractor oversight in the field.

The shift in contract administration culture is significant and requires the focus to be more on performance and less on compliance, emphasizing results and not process, and substitutes industry best practices for the Federal norm. This shift is requiring the Department staff to be retrained to fundamentally change and improve the way the Department conducts its business. DOE personnel are still transitioning to the new contractual arrangements. As the staff becomes better trained, adjusts to their new responsibilities and the new culture, and becomes more familiar with the new contracting vehicles, staffing needs can diminish. For the present, we continue to learn lessons regarding what these new contractual arrangements entail. It is still too early to gauge with any accuracy what our true Federal staffing requirements for contract oversight will be.

PERFORMANCED BASED CONTRACTS

Mr. Knollenberg. What other performance based contracts are in place? What results have been achieved there?

Admiral Guimond. At the present time, performance based contracts exists at the Idaho National Engineering Laboratory (INEL), (the first such awarded by the Department), Rocky Flats, Fernald, and Nevada. Oak Ridge is using incentives task order contracting for a significant portion of its environmental restoration activities.

GENERAL

Mr. Knollenberg. What results have been achieved there ?

Admiral Guimond. Our experience at INEL has provided us enough time to determine the types of results possible with the use if this new contracting approach. For example, with a cost savings of $800,00, the Advanced Test Reactor is operating at costs that are the lowest since 1991, with improved efficiency and safety. In addition, construction and environmental operations safety has improved dramatically, and there has been a savings of $15M in indirect costs.

The Department is still in the experimental stage of moving from an award to an incentive fee process. We continue to learn lesson regarding what the new contractual agreement entail, but I am confident that the new approach will make our contracting practices more cost-effective and efficient.

GENERAL

Mr. Knollenberg. How is privatiztion being applied to the Environmental Managment Program ?

Admiral Guimond. EM's goal for privatization is to reduce costs and boost productivity for those projects that can be more effectively handled by the private sector. Essentially, this will be achieved through incentives because the government will be paying for service and results instead of activity. Our experience to date with several small scale privatization projects is that with privatization EM can in fact significantly reduce costs and failure risks while getting far more product for the dollars spent. Therefore, in an increasingly stringent budget environment, privatization will boost EM's productivity in the future.

However, not all of EM's cleanup is compatible with privatization. We must use it where we can adequately define our waste streams and our treated waste product specifications. Where we can do this, we can save money by using a privatization contracting approach. For FY-97, EM proposes to move ahead with a number of important privatization including the Handford Tank Waste Remediation System (TWRS), and mixed waste treatment at Idaho and Oak Ridge. These initiatives are of considerable size and it successful will result in major cost and risk savings to EM. There are many more privatization opportuinities within the EM program, and as we make progress in refining and expanding our privatization initiative, more of our cleanup will be done this way.

COST SAVINGS

Mr. Knollenberg. Where have the cost savings been achieved ?

Admiral Guimond. Please refer to the attached chart for the cost savings.

EXAMPLES OF ENVIRONMENTAL MANAGEMENT PRIVATIZATION PROJECTS
(Completed or Underway, $ in Millions)

Site	Project Name	Cost Estimate ($M) M&O	Cost Estimate ($M) Private	Estimated Savings ($M)
Idaho	Alpha MW Treatment	$470	$184	$285
Hanford	Laundry	$100	$40	$60[1]
Savannah River	M-Area MW Tank Remediation	$39	$20	$19
Idaho	Laundry	$6	$1	$5[1]
Idaho	Pit 9 Remediation	$313[2]	$179[3]	$134

TOTAL SAVINGS $ 503 Million

NOTES:
1. Estimated savings based on assumed 10-year operation
2. DOE-Idaho independent cost estimate, including contingency
3. Private cost estimate assumes follow-on work

PRIVATIZATION

Mr. Knollenberg. What are future plans in this area?

Admiral Guimond. For FY 1997, EM proposes to move ahead with a number of important privatization projects including the Hanford Tank Waste Remediation System Privatization (TWRS), and mixed waste treatment at Idaho and Oak Ridge. These initiatives are considerable in size and, if successful, will result in major cost and risk savings to EM. There are many more privatization opportunities within the EM program, and as we make progress in refining and expanding our privatization initiatives, more of our cleanup will be done this way.

Mr. Knollenberg. What are the desired outcomes (more jobs, less cost) and expected results?

Admiral Guimond. EM foresees several desired outcomes, for instance, the opportunity to substantially increase efficiency and cost effective methods to obtain treatment, remediation, and support services. Privatization will also bring competency, innovation, new or improved technology methods, accountability, and efficiency of private vendors to bear in treating EM wastes.

We expect that cost effective privatization will enable EM to do more cleanup for the funds expended and shorten the time required to complete the treatment of remediation, thereby reducing risks associated with untreated wastes. Privatization will result in new jobs and increased economic activity.

GENERAL

Mr. Bevill. Do you currently know the contamination levels and clean-up progress at all DOE clean-up sites? In other words, do you feel confident that DOE has a good grasp of its inventory of clean-up sites and the problems existing at each one and is this information being used in determining future and final use of the sites?

Admiral Guimond. We have established some information basis for tracking progress and contamination. We have not, however, assembled an integrated information system that can provide long-term tracking, mapping and reporting of the condition of all of the Department's Environmental Management sites. Like the *Baseline Environmental Management Report*, which provided a useful benchmark to measure our progress on life-cycle cost reduction, a resource of this kind would serve as an authoritative management "yardstick" for measuring progress toward the goal of completing the Environmental Management program. That goal is to reduce the risk and cost at the sites sufficiently so that the only tasks remaining are long-term surveillance and maintenance. Following completion of this mission, this information would support the establishment and use of effective long-term institutional controls on the many sites which will require land-use restrictions or long-term surveillance and maintenance.

The Department is still in the process of characterizing and quantifying its environmental legacy. This legacy has four basic elements: wastes (such as high-level and transuranic wastes), contaminated environmental media (e.g. soil and groundwater), excess facilities, and a new category of non-waste "materials in inventory," such as spent nuclear fuel, nuclear materials and scrap metal.

Waste: An inventory of DOE wastes is now available in two annually updated reports: (1) *Integrated Database of Radioactive Wastes and Spent Nuclear Fuel* (IDB); and (2) the *Mixed Waste Inventory Report* (MWIR). Low-level wastes and hazardous wastes are routinely disposed of by the DOE complex. The Department is actively pursuing the establishment of repositories for high-level and transuranic wastes.

Environmental Media: The Office of Environmental Restoration maintains a working database of summary information about each release site. To date, about 50 percent of over 8,700 potential contaminated release sites at major DOE sites have been characterized. Over 2,600 of these sites have been completed. Surface remediation has been completed at 16 of the 24 Uranium Mill Tailings Remedial Action (UMTRA) program sites and 21 of the 46 Formerly Used Site Remedial Action program (FUSRAP) sites. Over 5,500 of the 6,000 vicinity properties have also been completed. The Environmental Restoration program has also decontaminated and decommissioned about 180 of over 1,000 facilities scheduled.

Excess Facilities: The 1992 *Surplus Facilities Inventory Assessment* assembled the first comprehensive look at the Department's legacy of excess facilities that require characterization and, in many cases, deactivation, decontamination or dismantlement. The Office of Field Management maintains the related Facility Information Management System. The Department has identified well over 20,000 facilities ranging from large reactors and chemical processing plants to guard shacks and office trailers. Of these, the Department has determined that approximately 4,100 are surplus. This includes nearly 600 abandoned facilities, over 1,200 shut down and over 400 on standby. So far, over 130 facilities have been deactivated and over 400 have been decontaminated and decommissioned.

Materials in Inventory: A recent DOE-wide Materials in Inventory (MIN) Initiative has laid the foundation for a comprehensive assessment of materials which are no longer in use by DOE programs. The Initiative's report, *Taking Stock*, is scheduled to be issued in the Spring of 1996. The MIN Initiative identified over 800,000 tons of material in ten different categories which are not in use by DOE. Many of these materials, such as spent nuclear fuel and excess fissile materials, present complex disposition and management issues which are in the process of being resolved.

These resources contain a considerable amount of information on the current state of the Department's environmental legacy. However, these data resources were assembled and structured in different ways for different purposes. As a result, they often contain only partial information on the Department's environmental legacy. For example, the Environmental Restoration database is used to plan and manage remediation activities. As a result, it does not include information on release sites where no further action is possible or planned but which need to be tracked for the long term. There is a great deal of additional information at the site and Operations Office levels but it has not been collected or integrated at the Headquarters level.

LAND USE ASSUMPTIONS

Mr. Bevill. Determining realistic land use assumptions before clean-up remedies are chosen could result in cost savings of up to $600 million annually according to a GAO report. What progress is being made by the Department to focus on ultimate land use issues before clean-up commitments are made?

Admiral Guimond. Significant progress is being made by the Department to consider eventual land use of a particular site, prior to a cleanup committment being made. The Department has involved stakeholders at all sites in discussions of specific cleanup remedies. To address site-wide visions for the future and how specific contamination problems and respective remedies will fit into a comprehensive site remediation plan, working groups have begun meeting at many sites to discuss future uses for particular sites. The *Future Use Report* to be published by the Department in April 1996 will provide a status of future use recommendations by stakeholders and issues relating to them for individual sites. It is the intention of the Environmental Management Program to use these recommendations to formulate site-specific environmental restoration plans as early in the remediation process as possible. Significant cost savings should be able to be achieved if reasonable future land use assumptions are agreed to at the various Department sites.

GENERAL

Mr. Bevill. A National Research Council report concluded that a major obstacle to progress in the environmental remediation program is not technical, but organizational. The report says that action by the program is too often driven "by the internal needs of the organizations charged with the remediation work rather than by the overall goal of environmental remediation." How would you respond to this criticism, and what steps have you taken to resolve the problem?

Admiral Guimond. The Secretary, very early in her tenure, recognized a number of interrelated weaknesses within the Department, including: (1) program goals were not well defined and articulated; (2) Department and contractor organizations were not aligned with program goals; and (3) contracting practices did not focus attention on the Department's goals. At his confirmation hearings as the Assistant Secretary for Environmental Management in early 1993, Tom Grumbly (now Acting Under Secretary) sought to address these weaknesses in part when he set forth six goals for the EM organization, including "being more outcome oriented," and "focusing on tangible results."

The current budgetary outlook, combined with stakeholder expectations, Congressional directives, and external oversight, have led EM to refocus and improve the management of the program to ensure that EM can accomplish its mission in the most safe, efficient, and cost-effective manner. By adopting a performance-based management system, EM Headquarters, field sites, and contractors are changing the way of doing business to efficiently achieve the goal of environmental cleanup and thereby provide a worthwhile return on the taxpayers' investment.

The NAS report is based on a series of snapshots of the program, taken over a period of several years. Since the NAS made their observations, EM has continued to implement innovative approaches to ensure that environmental cleanup is the major program focus. I would like to provide those approaches for the record.

EM INITIATIVES

- Developed the Baseline Environmental Management Report to accurately lay out program mission and objectives, as well as estimate the costs to achieve cleanup.

- Defined the roles, responsibilities, and authorities for headquarters and field organizations, consistent with the Environmental Management Strategic Plan, the Department's first.

- Revised and streamlined EM procedures to effect necessary, permanent, and positive changes, -e.g., uniform program and program execution guidance from headquarters to the field. This improved communication and direction is intended to ensure program execution by the field that is consistent with national program commitments to stakeholders.

- Increased involvement of stakeholders in program decision-making to ensure the activities undertaken will be acceptable to the regulators and the public. As a result, eleven sites across the complex now have Site-Specific Advisory Boards (SSAB), which provide input on cleanup activities, future land-use, budget, and other decisions at the site level, all of which contribute to our focus on the goal of environmental cleanup.

- Participated in numerous information exchange and benchmarking activities to ensure that lessons learned, both internal and external to the program, are communicated and applied.

- Formed the Environmental Management Advisory Board, made up of individuals from outside the Department, to provide advice, critiques, and recommendations for improving the way EM does business. Our continued interfaces with this Board provide a mechanism to review the Environmental Management program to ensure objectives, plans and activities are all focussed on maximizing cleanup results.

EM and Departmental management intend to remain vigilant, and to continue to encourage innovative approaches to complete the mission of the EM program.
Some evidence that we are succeeding in our efforts is revealed in the National Academy of Science's most recent report titled Improving the Environment: An Evaluation of DOE's Environmental Management Program, that stated that [a] "number of [EM's] initiatives are rapidly introducing change into a system that was established during the Cold War ... [EM's] principles and general direction are encouraging."

GENERAL

Mr. Myers. What is the current status of lawsuits, filed separately by state regulators and electric utilities, seeking judgment that the Department has a legal responsibility to accept spent fuel beginning in 1998?

Dr. Dreyfus. The petitions for review filed by various utilities, States and State public utility commissions were consolidated by the United States Court of Appeals for the District of Columbia Circuit under the title Indiana Michigan Power Company v. United States Department of Energy, Nos. 95-1279, 95-1321, 95-1463. On January 17, 1996, the Court heard oral argument from the parties and took the case under submission. No decision has yet been issued by the Court.

Mr. Myers. Does the Department continue to maintain that it has no obligation to accept spent fuel in the absence of a characterized repository site?

Dr. Dreyfus. The Department believes that it does not have an unconditional statutory or contractual obligation to begin accepting spent nuclear fuel in 1998 in the absence of a facility authorized, constructed and licensed under the Nuclear Waste Policy Act.

REPOSITORY PROGRAM

Mr. Myers. Please outline the Department's revised repository schedule.

Dr. Dreyfus. As a result of Congressional direction and a reduction in the Fiscal Year 1996 budget, the Department has refocused the site characterization program to achieve the following major program milestones which include: viability assessment in 1998, final environmental impact statement in 2000, formal site suitability determination and site recommendation in 2001, license application in 2002, and receipt of waste in 2010.

Mr. Myers. Does the Department plan to publish a "viability assessment" by 1998?

Dr. Dreyfus. The Department will conclude a package of work necessary to assess the Yucca Mountain Project's viability to Congress in late Fiscal Year 1998.

Mr. Myers. How does a viability assessment differ from a technical site suitability determination?

Dr. Dreyfus. The viability assessment will be comprised of the scientific, engineering and financial information required to assess the feasibility of moving forward with the repository program at Yucca Mountain. In making this assessment the Department will demonstrate its confidence in being able to make a formal site suitability determination and submit a license application in 2002. The viability assessment will also include preliminary design information and an estimate of the cost and schedule of continuing the Yucca Mountain Project through licensing, construction and operation. The "technical" site suitability determination in the former program plan involved additional work and review processes.

Mr. Myers. Is such an assessment proposed in lieu of a technical site suitability determination? If not, how will the assessment relate to the suitability determination?

Dr. Dreyfus. Yes. The viability assessment will provide information in 1998 on the feasibility of continuing with the Yucca Mountain Project, while the formal site suitability determination is part of the Department's process for the site's formal recommendation to the President. The "technical" site suitability determination included in the earlier program plan was a management tool to converge the scientific work at Yucca Mountain at an early date. It is replaced by the viability assessment which will address the most important engineering and scientific analyses. The formal site suitability determination remains the same. Under the Act, that determination, together with a final Environmental Impact Statement, will be the basis for the formal agency action to recommend the site to the President.

INTERNATIONAL REPOSITORY PROGRAMS

Mr. Myers. The Department notes that there is world-wide agreement to proceed with the development of geologic repositories by the international community. Which nuclear-capable countries are furthest along in the repository programs?

Dr. Dreyfus. The United States and Germany are the only nations characterizing candidate geologic repository sites for high-level waste and spent nuclear fuel. Under the 1996 revised Program Strategy, the Program retains its long-term goal of beginning waste emplacement operations in 2010. While Germany intended to begin repository operations in 2008, site characterization continues to be delayed by strong opposition from the local government. Germany is also conducting preliminary examination of alternate disposal sites. Canada, Sweden and Switzerland all have active underground laboratories but have not proceeded with selecting a site for a high-level waste repository. Other countries have not advanced as far.

Mr. Myers. When can we expect other developed countries to begin deployment of their permanent solutions to the disposal of spent fuel? Please cite specific examples.

Dr. Dreyfus. Most countries are in various stages that precede site selection:

> Sweden is reviewing the suitability of two volunteer sites, intends to look at additional sites, and plans to begin a repository demonstration phase in 2010 and full-scale repository operations in 2020.
>
> Finland will choose one out of three identified sites and plans to open a repository in 2020.
>
> Spain is considering three rock types (granite, salt and clay) for its repository, will conduct area screening, and plans to open a repository in 2020.
>
> Switzerland has selected potential sites for surface characterization and plans to open a repository after 2020.
>
> France is considering various media and plans to open a repository between 2020 and 2025.
>
> Belgium has selected the rock type for its repository, which it expects to open after 2035.

Canada is evaluating the concept of geologic disposal which is currently under extensive environmental impact review. The country has not established an expected date for repository operations to begin.

Japan is considering various media, will conduct area screening, and plans to open a repository by 2045.

The United Kingdom has not established a definite start-up date. The country's nuclear industry assumes a repository will be available between 2080 and 2100.

SPENT FUEL LEAD LABORATORY

Mr. Myers. Last October, a settlement agreement on spent fuel and nuclear waste was executed by the Department of Energy, the Navy and the State of Idaho. That agreement identifies the Idaho National Engineering Laboratory (INEL) as the lead DOE laboratory for research, development and related work involving spent fuel storage, treatment and disposal. What implications, if any, does this agreement have for the budget of the Office of Civilian Radioactive Waste Management (OCRWM)?

Dr. Dreyfus. The Program's Fiscal Year 1997 budget does not include any funds for research, development, and related work involving spent fuel storage, treatment, and the disposal at INEL. Therefore, the agreement has no implications for the Program's FY 1997 budget request.

Mr. Myers. Please describe the relationship, if any, between the OCRWM and the DOE Spent Fuel Lead Laboratory.

Dr. Dreyfus. OCRWM and the Office of Environmental Management (EM) work together on the Spent Fuel Working Group, which is charged with responsibility to coordinate interaction related to the disposal of DOE spent fuel. The DOE Spent Fuel Lead Laboratory is carrying out work under the direction of EM in support of its efforts to manage DOE spent nuclear fuel and prepare it for disposal, including direct support to EM's participation in the Spent Fuel Working Group. OCRWM has no other direct contact with the Spent Fuel Lead Laboratory, and is not involved in any efforts underway there.

Mr. Myers. Will INEL undertake new research responsibilities as a consequence of its designation as the DOE Spent Fuel Lead Laboratory? If so, what are the budgetary implications of these new responsibilities?

Dr. Dreyfus. In order to fulfill its mission to safely manage spent fuel, provide interim storage, and prepare for disposal, the DOE Spent Fuel Lead Laboratory will likely need to conduct research activities. The specific activities required for preparation for disposal are being evaluated. They may include activities to: establish safe methods to treat or condition DOE spent fuel to allow for storage and disposal; conduct testing to provide data to allow for the qualification of DOE spent fuel for storage and disposal; and conduct research and development to support the design and fabrication of storage equipment, and transportation and disposal at Program facilities. The DOE Spent Fuel Lead Laboratory's activities are funded by the Office of Environmental Management.

Mr. Myers. What sources of funds will be used to execute these responsibilities?

Dr. Dreyfus. The DOE Spent Fuel Lead Laboratory's activities are funded by the Office of Environmental Management.

NUCLEAR WASTE FUND

Mr. Myers. Many public utility commissions (PUCs), motivated by concerns about the pace of the waste disposal program, are questioning the propriety of continued collection of the one mill per kilowatt-hour fee. How does the Department assess this situation?

Dr. Dreyfus. The Nuclear Waste Policy Act included provisions to finance the nuclear waste program through a fee on producers of the waste.

The Administration is attempting to address the concerns of the public utility commissioners by implementing an effective Civilian Radioactive Waste Management Program. We have focused our efforts on the timely address of critical issues that will impact the assessment in 1998 of the viability of licensing the proposed repository site for the disposal of utility wastes. In addition, we are actively working to engage industry in the development of a market-driven waste acceptance and transportation strategy that, when implemented, will permit us to make rapid progress in the acceptance and transportation of waste. In the interim, the utilities are required under Section 302 of the Nuclear Waste Policy Act to provide for payment of fees into the Nuclear Waste Fund sufficient to offset program expenditures. The fees that are being paid are intended to ultimately reimburse the Federal Government for the full life-cycle cost of disposing of nuclear spent fuel. Agreement to pay the fee is a condition of the Nuclear Regulatory Commission issuing or reviewing a license for a nuclear power plant. This fee is similar in character to other user fees that the Federal Government collects to offset expenditures for programs or services that benefit these users.

Mr. Myers. Does DOE consider it possible or likely that some PUCs may refuse to permit pass-through of this fee to nuclear utility consumers?

Dr. Dreyfus. The Nuclear Waste Policy Act contains a specific requirement that fees for disposal of spent nuclear fuel be paid to the Treasury. The Supremacy Clause of the Constitution would preclude the State Public Utility Commissions from prohibiting utilities from continuing to make scheduled payments to the Treasury.

Mr. Myers. What, if anything, is the Department doing to allay the fears and concerns of the PUCs?

Dr. Dreyfus. The Administration is committed to implementing an effective Civilian Radioactive Waste Management Program. At Yucca Mountain, we have tunneled over three miles into the mountain and have gained efficiencies that allow us to be well ahead of our tunneling schedule. The tunnel boring machine is currently operating within the proposed repository geologic formation and is permitting our scientists and engineers to conduct direct observation and analysis of the subsurface geological and hydrological conditions. The information gained has enhanced and, to a significant degree, confirmed our understanding of conditions at the site.

We have focused our efforts at Yucca Mountain to address the critical unanswered technical questions leading to an assessment in 1998 of the viability of licensing the proposed repository site. With appropriate support from Congress on our financial resources, with a restructured approach to the remaining regulatory work, and with confirmation of the viability of Yucca Mountain, we believe that we can achieve a target date of 2002 for submittal of a license application to the Nuclear Regulatory Commission.

The program is also maintaining a core capability in the waste acceptance, storage, and transportation areas to respond rapidly should new policy direction emerge regarding interim storage. We have devised a two-stage strategy that assumes that the Yucca Mountain viability assessment will be completed in Fiscal Year 1998 and that an interim storage facility site could be designated in Fiscal Year 1999. The first stage of the strategy includes those activities that do not require a specific site for an interim storage facility, but could expedite the start of interim storage operations, if and when Congress designates a site. The revised strategy includes the development of a market-driven approach that utilizes the private sector for waste acceptance, storage, and transportation services. We will also conduct safety and environmental analyses that are not contingent on having a specific site for an interim storage facility. The Administration has stated its position that no interim storage facility site be considered until the information from the repository viability assessment is available in 1998. The second stage of the strategy involves work to be accomplished after a site is designated and includes facility development and the acquisition of waste acceptance, storage, and transportation equipment and services from the private sector.

TOTAL SYSTEM LIFE CYCLE COST

Mr. Myers. Please summarize the findings of the revised Total System Life Cycle Cost report completed during the past year.

Dr. Dreyfus. The 1995 Total System Life Cycle Cost (TSLCC) report, published in September 1995, provided a snapshot of the total system cost to implement a surrogate waste management system. The scenario used in this analysis is a one-repository system without interim storage. Yucca Mountain was assumed as the location of the repository since it is the only site that the Department is authorized by law to characterize This does not constitute a predecision on the determination of the acceptability of the site for the repository The estimate is based on acceptance and disposal of about 84,000 metric tons of uranium of spent nuclear fuel and about 18,000 canisters of vitrified defense high-level waste. Findings from this report are shown in a table which I would like to insert in the record. The information follows

Summary of Cost Estimates from the 1995 TSLCC
(In millions of 1994 dollars)

Cost Category	Cost
Repository	$18,764
Waste Acceptance, Storage & Transportation	10,094
Other Development & Evaluation	3,513
Payment Equal to Taxes	308
Benefits	417
Total	$33,096

Mr Myers Does the Department estimate that current program fees are adequate to fund life cycle costs?

Dr Dreyfus The Department has not completed its analysis of the adequacy of the 1 0 mill per kilowatt-hour fee currently being paid into the Nuclear Waste Fund by the owners and generators of spent nuclear fuel However, preliminary calculations using the 1995 TSLCC cost estimates indicate that the fee will be adequate

BUDGET REQUEST

Mr. Myers. The Department's detailed budget request for appropriations from the Nuclear Waste Fund is $28,000 higher than the President's request. Why?

Dr. Dreyfus. The $28,000 increase in the FY 1997 request for appropriations from the Nuclear Waste Fund is requested in accordance with the Department's initiative to establish a working capital fund to finance common administrative services The goal of the working capital fund is designed to increase Departmental efficiency and achieve overall financial savings throughout the Department

Mr Myers From which activity does the Department propose to deduct the $28,000?

Dr. Dreyfus. Prior to FY 1997, the Office of Civilian Radioactive Waste Management included in its budget requests amounts necessary to pay for its share of costs incurred in the operation of the Forrestal building, and for common administrative services In FY 1997, the Department directed that in addition to the funding the program provided annually for rent and administrative services, the program would be required to contribute to the newly established working capital operating fund The establishment of the capital working fund which necessitates that all programs within the Department fully fund the costs they incur for common administrative service, will allow the request for Departmental Administration to be reduced

Mr. Myers. Why do the Department's requests for program management, program direction and human resources increase in fiscal year 1997, only to decrease in fiscal year 1998 projections?

Dr Dreyfus The funding levels for Program Integration (Program Management, Program Direction and Human Resources) are directly related to and in support of the work and funding levels at the Yucca Mountain Project as well as the Waste Acceptance, Storage and Transportation Project The increase in the Program's fiscal year 1997 budget request for Program Integration is required to support increased activities at Yucca Mountain and the termination costs related to reducing the total number of Federal full-time equivalents.

The President's FY 1997 budget assumes significant discretionary program savings steadily from 1998 through 2002, helping to reach a balance in fiscal year 2002 under Congressional Budget Office economic assumptions To achieve these savings, the Office of Civilian Radioactive Waste Management program was reduced by $32 million, when fiscal year 1998 is compared with fiscal year 1997

PERFORMANCE ASSESSMENT

Mr. Myers. Your testimony indicates that the Department will initiate a phased peer review of the performance assessment that will run through 1999, provided funding is available. How much funding is required?

Dr. Dreyfus. Because the Total System Performance Assessment (TSPA) process is complicated and not widely applied outside of the high-level radioactive waste program, a technical peer review involves assessments of the supporting process models, abstracted performance assessment models, the TSPA itself, and the methods by which these components are integrated. The Department has defined four major activities to guide the review process and demonstrate systematic progress: TSPA Orientation; Process Model Review; Abstract Model Review; and TSPA-Viability Assessment (VA) Review. The first TSPA-VA activity module, Total Systems Performance Assessment Orientation will culminate in Fiscal Year 1997, and activities associated with the second module, Process Model Review, will be initiated.

The Department is in the process of estimating the cost of the phased peer review as part of the ongoing Fiscal Year 1997 and long-range planning activities. A precise estimate of the cost is not available yet. Funding to initiate the TSPA peer review process in Fiscal Year 1996 is $270,000.

TERMINATION COSTS

Mr. Myers. Please estimate the total termination costs for the programs administered by the Office of Civilian Radioactive Waste Management.

Dr. Dreyfus. Based on a preliminary analysis, the cost of terminating the Program's contract obligations and performing minimal reclamation at the Yucca Mountain site will total approximately $150-250 million. This figures assumes that the tunnel boring machine will remain in the tunnel and that the tunnel will be sealed with a steel door, rather than backfilled. Boreholes would be plugged, support facilities dismantled, and trenches reclaimed. Closeout activities would take approximately two years.

A comparison with Superconducting Supercollider (SSC) termination costs may be useful, since that project involved about two thousand contract employees, a tunnel boring machine, and several miles of tunnel. In FY 1995, $640 million was appropriated to pay for SSC termination costs.

REPOSITORY PROGRAM

Mr. Myers. When will the Advanced Conceptual Design Report be issued? Please describe the purpose of this report.

Dr. Dreyfus. The Mined Geological Disposal System Advanced Conceptual Design (MGDS ACD) was issued in March 1996. The MGDS ACD report was prepared for the Department to present a reference repository design with the Civilian Radioactive Waste Management System. The objective of the report is to present a single integrated design concept for the Mined Geologic Disposal System Element that meets the requirements and constraints of the program as currently understood. The concepts reported in this document represent the completion of the advanced conceptual design phase for the MDGS Element. The MGDS ACD report consists of four volumes:

Volume I - Overview - Presents the integrated description of an entire MGDS Element design. It includes a brief history of the program and design evolution, a summary of design criteria, bases and assumptions, concepts of operation, site characteristics and data, a summary of performance assessment, discussion of major issues influencing the MGDS design, discussion of design solutions that address the major issues, and a brief discussion of the site segment.

Volume II - Repository - Represents a design concept for the repository segment. This segment consists of surface and subsurface facilities at the repository and transportation systems within Nevada.

Volume III - Engineered Barrier Segment/Waste Package - presents a design concept for the Engineered Barrier Segment with includes the Waste Package System.

Volume IV - Life Cycle Cost and Schedule - provides life cycle cost data and associated life cycle scheduled for the MGDS Element including design, development and evaluation, construction, startup, operations and closure. Cost data uses data from the Total System Life Cycle Cost Report, updated where possible, to reflect the design concept presented in this report.

ENVIRONMENTAL IMPACT STATEMENT

Mr. Myers. Which repository Environmental Impact Statement activities will be reinitiated in Fiscal year 1997?

Dr. Dreyfus. The following activities will be conducted in fiscal year 1997 for the repository EIS:

> The support contract for the EIS contractor will be awarded and the contractor will be brought on board.
>
> Technical guidelines will be developed for each technical area to be evaluated in the EIS.
>
> Scoping comments will be reviewed and a comment response document will be prepared.
>
> Existing data will be reviewed, in context with scoping comments, and evaluated for use in the EIS. Data gaps will be identified and work will be initiated to acquire the necessary information.
>
> The description of proposed action and alternatives will be finalized, based on scoping comments/responses.
>
> Baseline data will be developed, based on the technical guidelines, for evaluation in the EIS.

Mr. Myers. How much money will be committed to EIS efforts in the coming fiscal year?

Dr. Dreyfus. The FY 1997 funding specified in our Congressional budget request is $5.0 million.

Mr. Myers. How long does the Department anticipate that spent fuel would remain retrievable after emplacement in the repository?

Dr. Dreyfus. The repository will be designed to permit waste retrieval for up to 100 years from the start of waste emplacement, rather than the 50-year retrieval period required by the Nuclear Regulatory Commission (NRC). This design goal will provide assurance that the performance confirmation program required by the NRC could be conducted over an extended period, if necessary, to acquire longer-term information from monitoring changes to the site caused by excavation, thermal-mechanical, and radiation effects.

WASTE ACCEPTANCE

Mr. Myers. What is the "burn-up credit topical report"?

Dr. Dreyfus. The report in question is the "Topical Report on Actinide-Only Burnup Credit for Pressurized Water Reactor (PWR) Spent Nuclear Fuel Packages" dated May 1995. The report was prepared by the Program and submitted to the Nuclear Regulatory Commission. The objective of the report is to present to the Commission for review and acceptance a methodology for using burnup credit in the design of criticality control systems for PWR spent fuel storage, transportation, and disposal packages.

Historically, safety analyses of criticality control systems for spent fuel transportation packages assume that the spent fuel loaded into the package is "fresh" or unirradiated. The "fresh" fuel assumption is very conservative since the potential reactivity of the nuclear fuel is substantially reduced after being irradiated in the reactor. The concept of taking credit for this reduction in nuclear fuel reactivity due to burnup of the fuel, instead of using the fresh fuel assumption in the criticality safety analysis, is referred to as "burnup credit." Burnup credit uses the actual physical composition of the fuel and accounts for the net reduction in fissile material and the buildup of neutron absorbers in the fuel as it is irradiated.

Although the fresh fuel assumption represents a conservative design approach, which substantially simplifies the criticality safety analysis and associated administrative controls, it results in a significant reduction in spent fuel capacity of transportation, storage and disposal packages. Analyses have shown that using burnup credit to maximize package capacities is a justifiable concept that would result in reduced public risk and program costs.

Mr. Myers. The Office of Civilian Radioactive Waste management no longer requests funds to maintain spent nuclear fuel in storage casks at the Idaho National Engineering Laboratory. Will the Office of Environmental Management assume maintenance responsibilities for this spent fuel?

Dr. Dreyfus. An agreement to transfer ownership and management, including maintenance responsibilities, of 38 metric tons of spent nuclear fuel contained in four dry storage casks at the Idaho National Engineering Laboratory from the Office of Civilian Radioactive Waste Management to the Office of Environmental Management was reached in December 1995.

Mr. Myers. Please report on the status of efforts to identify a responsible entity for this activity.

Dr. Dreyfus. The Office of Environmental Management will assume responsibility for maintenance of this spent fuel on October 1, 1996.

Mr. Myers. The Department continues to accept spent nuclear fuel from foreign research reactors based upon an obligation to do so. What is the source of this obligation?

Dr. Dreyfus. The Department's acceptance of fuel from foreign research reactors supports nonproliferation of weapons-usable material and is consistent with Section 903(a) of the Energy Policy Act of 1992, which restricts the export of highly enriched uranium from the United States. The Department's acceptance of foreign research reactor spent fuel for storage and disposal in the United States is based on furtherance of our Nation's long-standing nuclear weapons nonproliferation policy. The acceptance of this fuel enriched in the United States will limit the availability of highly enriched uranium that could potentially be used to produce nuclear weapons. Ultimately, the proposed acceptance policy, together with the United States program to develop low enriched fuels on which the foreign research reactors could run, is designed to eventually eliminate the use of highly enriched uranium fuels in civil commerce worldwide.

Mr. Myers. How does this obligation differ from the statutory obligation to begin accepting spent fuel from the civilian power industry in 1998?

Dr. Dreyfus. The Department has concluded that it does not have an unconditional statutory or contractual obligation to accept high-level waste and spent nuclear fuel beginning January 31, 1998, in the absence of a repository or interim storage facility constructed under the Nuclear Waste Policy Act of 1982, as amended. The foreign spent fuel activity is unrelated to the authorities and obligations of the Nuclear Waste Policy Act, as amended.

SPENT FUEL INVENTORY

Mr. Myers. Argonne National Laboratory is developing a nuclear fuel electro-refining process that can, according to the lab, "treat more than 90% of DOE's spent fuel inventory, converting it into a common waste form suitable for treatment and long-term storage." Is this process, as currently conceptualized, compatible with the repository plans being developed by the Office of Civilian Radioactive Waste Management?

Dr. Dreyfus. Current planning by DOE-OCRWM is focused on the direct emplacement of commercial reactor spent fuel and on the disposal of vitrified defense reprocessing wastes. There is a tacit understanding between OCRWM and EM that the repository will also accept spent fuel from the DOE-owned spent fuel inventory, and an RW-EM task force has been constituted to address this issue. Because the emplacement of the DOE spent fuel is likely to follow the emplacement of commercial spent fuel and defense wastes, the EM planning calls for extended interim storage of stabilized DOE spent fuels. In the interim period, as repository acceptance criteria becomes more firm, it may be necessary to subject some of the DOE spent fuel to treatment in preparation for emplacement, and the Argonne process is considered a candidate process for treatment of some of DOE's spent fuel. The Department has proposed (pending completion of an appropriate document prepared pursuant to the National Environmental Policy Act) to demonstrate electrometallurgical treatment technology on irradiated sodium-bearing fuel which has been removed from the Experimental Breeder Reactor II. When this demonstration project is complete, the Department expects to have sufficient information to make a decision on future potential applications of the technology.

SPENT FUEL INVENTORY

Mr Myers. What implications would successful deployment of this process have for the high level waste disposal system at Yucca Mountain?

Dr Dreyfus. The electro-metallurgical treatment process being developed at Argonne National Laboratory, if successfully demonstrated and subsequently deployed for treatment of certain DOE spent nuclear fuels, could greatly decrease the disposal costs for these DOE wastes. This would come about by a reduction in the volume of material requiring disposal and lower costs associated with qualifying for fewer DOE waste forms.

YUCCA MOUNTAIN SITE CHARACTERIZATION

Mr. Myers. Please discuss any significant or reportable findings since your last appearance before the Subcommittee regarding the three major areas of site investigation: vulcanism, earthquakes, and movement of air and water through the rock.

Dr. Dreyfus. During the past two years, the Yucca Mountain Project conducted the Probabilistic Volcanic Hazard Analysis (PVHA) expert judgment project. The purpose of this project was to elicit an assessment from an expert panel of earth scientists of the probability of a volcanic event disrupting the potential repository at Yucca Mountain and to quantify the uncertainties associated with this assessment.

The PVHA project was centered around four workshops and two field trips that provided an opportunity for technical discussions and interactions, with the objective of ensuring a common understanding of the issues to be addressed. The members of the expert panel were supplied with all pertinent data gathered by the YMP, the State of Nevada, and the Center for Nuclear Waste Regulatory Analysis.

The final expert elicitation workshop for PVHA was held during December 1995. While a wide variety of approaches were used by expert panel members, the preliminary mean probability of a future volcanic event directly penetrating the repository and erupting at the surface is approximately $2x10^{-8}$ events per year or about a 1 in 50,000,000 chance. The expert panel's estimate of probability is virtually identical to that produced by project scientists, suggesting that the volcanic hazard is now fairly well bounded by a wide range of scientific interpretations.

Fifteen new digital seismic stations were added to the Southern Great Basin Network. These new stations are proving to be considerably more sensitive than the older analog recording stations and have lowered the seismic event detection threshold in the vicinity of the proposed repository to a magnitude -1 to -1.5 event. During the past year no events above the detection threshold have been observed beneath the proposed repository block.

Significant conclusions related to the movement of air and water include:

> Zeolitic formation within the Calico Hills unit coincides with the distribution of perched water along the interface between the Calico Hills and Topopah Springs units.
>
> Analysis of pneumatic signals form NRG-6 and NRG-7a indicates that Exploratory Studies Facility effects are insignificant at distances less than 500 meters.

Mr. Myers. Your testimony indicates that the Department has discovered no geologic conditions that would render Yucca Mountain unsuitable as a repository site. It is axiomatic that the Department's confidence in the repository site should rise as experiments and explorations proceed without disqualifying discoveries. Are you prepared to hazard an estimate on the odds that the site will be found suitable?

Dr. Dreyfus. There are a number of reasons why the Department's confidence in the site is rising. Improved age dating and residence time dating of pore waters and fracture fillings and pneumatic testing provide a significantly improved basis for evaluating the site. Process modeling and TSPA have allowed the Department to reduce the suite of radionuclides to be studied from the twenties to three. Project scientists are converging on a preferred hydrologic model. Confidence is building in the site transport model as well.

Mr. Myers. Whatever those odds, have they not risen significantly over the past year?

Dr. Dreyfus. The Department's confidence in the site has risen, based on data gathering over the past year.

Mr. Myers. Last year, researchers at Los Alamos National Laboratory raised the possibility that nuclear material stored at Yucca Mountain could concentrate in the surrounding rock to form a supercritical mass, resulting in massive nuclear explosions. This theory was debunked in a scientific review released earlier this month by the nuclear engineering department at the University of California at Berkeley. Has the Department reviewed this research?

Dr. Dreyfus. The Department received a draft report from the University of California review group; we understand that it is currently being revised. Our initial review of the draft is generally favorable; however, the analysis is directed principally to the disposal of weapons-grade plutonium, rather than the spent nuclear fuel and defense high-level waste currently authorized for disposal if the Yucca Mountain site is found suitable. The DOE civilian spent nuclear fuel disposal program has included consideration of potential nuclear criticality since 1978 or before. Criticality considerations are included in the ongoing DOE site suitability and repository design programs. We intend to consider any configurations where nuclear excursions might be possible, if our analysis shows them to present any risk to the public, the environment or the repository staff. We will include the Los Alamos work in our evaluation, along with other relevant configurations. A variety of recent scientific analyses, by different groups of authors, agree with the draft University of California evaluation that nuclear explosions are somewhere between highly unlikely and impossible.

Mr. Myers. Does it agree with the review's finding that a supercritical event at Yucca Mountain is not credible?

Dr. Dreyfus. We expect to find that the risk attributable to such events is extremely small, and intend to do whatever is required--if anything is shown to be required--to make it extremely small.

Mr. Myers. In research performed for the Technology and Resource Assessment Corporation and submitted to the Nuclear Waste Project Office of the State of Nevada,[1] investigators conclude that, "hydro fractures may intersect an existing network of open conduits at certain locations at Yucca Mountain." They further aver that research indicates, "extreme extentional deformation and stress at the Yucca Mountain site." What does this mean in layman's terms and what are the implications of these findings for the Yucca Mountain project?

Dr. Dreyfus. The Department is familiar with this work and has reviewed it internally. Hydrofractures may form as a result of several processes, including emplacing nuclear waste in the mountain. These processes are being investigated and evaluated by YMSCO throughout the Site Characterization Program. The Yucca Mountain site has experienced extensional deformation, but to say that it is extreme could be misleading. The Death Valley region, for instance, has experienced much more extension than Yucca Mountain. These processes are being investigated and evaluated as part of the ongoing site characterization program. Information acquired to date does not indicate any disqualifying conditions for the Yucca Mountain site.

Mr. Myers. Does DOE concur in these observations?

Dr. Dreyfus. Ongoing work by YMSCO will continue to address and evaluate these processes, but results to date do not support any reason to discontinue evaluation of the site.

Mr. Myers. In general, does DOE consider research commissioned by Nuclear Waste Project Office credible?

Dr. Dreyfus. As a matter of policy, the Program does not comment generally on the credibility of work commissioned by oversight groups established under the Nuclear Waste Policy Act, such as the Nevada Nuclear Waste Project Office. However, we carefully consider each individual finding for purposes of decision making.

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[1] *Conservation of Mass Analysis for High-Pressure Slug Injection Tests with Application to Yucca Mountain, Nevada,* Data by John Bruce Davies and Charles B. Archambeau.

YUCCA MOUNTAIN SITE CHARACTERIZATION

Mr. Myers. In related research,[2] investigators have projected a potential elevation of the water table below the proposed repository site in response to a moderate earthquake. The research concludes that, "as the proposed repository would only be 200 to 400 meters above the present water table, this predicted rise in the water table indicates a potential hazard involving water intrusion." The study continues: "This, of course, would also be a serious hazard for containment of the radionuclides at the proposed repository". Is the Department familiar with this research?

Dr. Dreyfus. The Department is familiar with this work and has reviewed it internally.

Mr. Myers. Is it, in the Department's opinion, based on sound science?

Dr. Dreyfus. The work includes some sound data, but in some areas employs an unrealistic treatment of physical properties and draws speculative and sensational conclusions that are not supported by the data. The work postulates changes in water level of several hundred meters resulting from moderate (magnitude 6) earthquakes.

Mr. Myers. Has the Department made a determination as to the validity of these findings?

Dr. Dreyfus. The Department believes that it is important to evaluate what we know about the past history of similar types of events. During the Little Skull Mountain earthquake (magnitude 5.7, located 10 miles from Yucca Mountain) which occurred on June 29, 1992, water levels in several boreholes located on and near Yucca Mountain were monitored. During the event, water levels rose less than one meter and returned to normal within approximately 2 hours. A slightly larger water level response was experienced after the Landers, California earthquake (magnitude 7.5, located 190 miles from Yucca Mountain) which occurred just 22 hours earlier. The rise at Yucca Mountain was less than two meters and most water levels in the region quickly returned to pre-quake values. Neither of these events would have any impact on the proposed repository. These data suggest that it would be unlikely that water would rise hundreds of meters in response to a moderate (magnitude 5-6) earthquake. The NAS panel on Coupled Hydrologic/Tectonic/Hydrothermal Systems at Yucca Mountain arrived at a similar conclusion. "The panel concludes, given the experience from historic earthquakes, the small modeled response of the water table to earthquakes consistent with the historic experience, the low strain rates and low seismicity both in magnitude and frequency of occurrence of the Yucca Mountain area, that significant water table excursions to the design level of the repository are unlikely."[3]

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[2] *Geohydrological Models and Earthquake Effects at Yucca Mountain, Nevada* by John Bruce Davies and Charles B. Archambeau.

[3] *Ground Water at Yucca Mountain How High Can it Rise?,* Final Report of the Panel on Coupled Hydrologic/Tectonic/Hydrothermal Systems at Yucca Mountain, Board on Radioactive Waste Management, Commission on Geosciences, Environment, and Resources; National Research Council.

Mr. Myers. In yet another related study funded by the State of Nevada Nuclear Waste Project Office,[4] investigators suggest that certain mineral deposits within Yucca Mountain may be, "of hypogene (deep-seated) origin and therefore a potential threat to the integrity of the proposed nuclear waste repository." What is the Department's response to this conclusion?

Dr. Dreyfus. While the State of Nevada supported study was published in 1995, the lines of evidence and hypothesis put forward by the authors of that publication were addressed in the study conducted by the National Academy of Science's Panel on Coupled Hydrologic/Tectonic/Hydrothermal Systems at Yucca Mountain in 1992. The panel's overall conclusion was than none of the evidence cited as of that time as proof of ground-water upwelling in and around Yucca Mountain could be reasonably attributed to that process. The preponderance of features ascribed to ascending water clearly were classic examples of arid soil characteristics recognized world wide. In particular, the panel concluded from geologic features observed in the field and geochemical data that there is no evidence to support the assertion that the water table has risen periodically hundreds of meters from deep within the crust. In fact, the evidence strongly supports a surface-process origin from rainwater for the vein and surface parallel carbonate and carbonate-silica deposits throughout the Yucca Mountain area.

In the recent Yucca Mountain Project Progress Report #13, the results of studies of calcite and opaline silica vein deposits are reported. The objectives of these studies are to determine the ages, distribution, origin, and paleohydrologic significance of calcite and opaline deposits along faults and fractures in the vicinity of Yucca Mountain. Conclusions regarding the modes of formation of unsaturated zone calcite and opaline silica are:

> Secondary calcite and opal on fractures and other open spaces in the unsaturated zone have been deposited from meteoric waters (waters derived from the atmosphere) percolating downward through the zone.
>
> Although secondary opal in the unsaturated zone seems to occur mainly from the upper 200 meters, secondary calcite compatible with waters descending from the soils occurs throughout the zone.
>
> Ongoing studies, especially in the Exploratory Studies Facility, are producing additional information that addresses the question of a possible hypogenic (caused by ascending fluids) versus a pedogenic origin (caused by descending fluids from the earth's surface) for calcite/calcite opal deposits. To date, however, the evidence continues to support a pedogenic origin.

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[4] *Overview of Calcite/Opal Deposits at or Near the Proposed High-Level Nuclear Waste Site, Yucca Mountain, Nevada: Pedogenic, Hypogen, or Both? by Carol A. Hill, Yuri V. Dyblyansky, Russell S. Harmon, and Christine M. Schluter.*

INTERIM STORAGE

Mr. Myers. Last year, Congress appropriated $85 million for development of an interim storage facility, to be available only upon the enactment of legislation authorizing such a facility. Please detail for the record how you would plan to spend that money should the requisite legislation be enacted into law this year.

Dr. Dreyfus. On December 14, 1995, Secretary O'Leary testified that the selection of the candidate site for an interim storage facility should await the results of the 1998 viability assessment of the repository. We plan to narrow the focus of our scientific work at Yucca Mountain to address the remaining critical and technical uncertainties and develop the information needed to assess the site's viability as a geologic repository in 1998. At that point, the Department will be better prepared to consider Nevada as a candidate interim storage site or determine the need to consider other candidate sites.

Consistent with the approach adopted by the Congress as described in the program guidance that supported our FY 1996 appropriations, the waste acceptance, storage, and transportation program element supports those activities needed for long lead-time preparations that must precede any near-term removal of spent fuel from the reactor sites. These activities include:

> Analysis of licensing an interim storage facility with the Nuclear Regulatory Commission that addresses the safety requirements for a phased interim storage facility when a site is selected.
>
> Support for a market-driven national transportation capability to move spent fuel by awarding contracts to the private sector for hardware development, canister production, waste acceptance, and transportation services. Currently, we are planning to solicit input from the industry and begin engaging the private sector in developing the specifications for this major systems acquisition. The procurement of transportation-related equipment and services would require the obligation of funds post-FY 1997 with most of the funds outlayed over several future years. This activity should spur commercial technology and innovation. It would also respond to the interests and concerns of the nuclear utilities and would support a siting decision at a later date.

If legislation were enacted directing the Department to initiate work on an interim storage site this year, we would begin work on awarding the procurement for canister, transport cask and storage module production, and waste acceptance and transportation services. The $85 million would need to be available for expenditure in order to perform this major system acquisition. In addition, we would begin work on the site-specific safety analysis of the interm storage facility. But I want to reemphasize that, in the Administration's view, moving forward on an interim storage site must await the completion of the viability determination at the Yucca Mountain repository site.

Mr. Myers. The Administration has expressed its opposition to legislation that would site an interim storage facility. What alternative plans has the Department developed so that it will be prepared to accept commercial spent fuel by the statutory deadline of 1998?

Dr. Dreyfus. The Department has no alternative plans that would accommodate the acceptance and transport of spent nuclear fuel in 1998.

Mr. Myers. On February 9, 1995, Secretary O'Leary, testifying before the House Subcommittee on Energy and Power, pleaded with Congress to "untie" her hands so the Department could pursue the construction of an interim storage facility. Yet the Administration opposes authorizing legislation which would do exactly that. How does the Department propose that its hands be untied?

Dr. Dreyfus. In testimony before the Senate Committee on Energy and Natural Resources on December 14, 1995, Secretary O'Leary stated that the selection of the candidate site for an interim storage facility should await the results of the 1998 viability assessment of the repository. We plan to narrow the focus of our scientific work at Yucca Mountain to resolve the remaining critical and technical uncertainties and develop the information needed to assess the site's viability as a geologic repository in 1998. At that point, the Department will be better prepared to consider Nevada as a candidate interim storage site or determine the need to consider other candidate sites. In the interim, we have restructured our waste acceptance, storage, and transportation activities to advance our capability to transport waste and license an interim storage facility.

Mr. Myers. Has the Administration developed a legislative proposal that would permit the Department to immediately pursue development of an interim storage facility?

Dr. Dreyfus. The Administration's proposal is to carry out only non-site-specific work. That work does not require legislation other than the appropriation of funds.

Mr. Myers. Specifically, what types of non-site specific activities in support of interim storage is the Department pursuing with available resources?

Dr. Dreyfus: Work that can be initiated on an interim storage facility prior to site designation includes development of a facility design, based on conservatively determined environmental and design parameters that can accommodate virtually any site. We will initiate interactions with the Nuclear Regulatory Commission to evaluate and discuss non-site-specific safety issues. Siting evaluation factors contained in Nuclear Regulatory Commission regulations (10 CFR Part 72) and other Commission guidance will be used to assist in developing environmental and general design criteria.

If sufficient funding is available, we will prepare a topical safety analysis report for submittal to the Commission. Initiating the development and review of the topical safety analysis report ahead of site designation will reduce the time required later for preparation of the license application and its subsequent review by the Commission. The report would satisfy license application safety and engineering analyses requirements to provide information on the facility design, operations, and supporting systems, on radiation protection and accident analyses; and on installation design and design criteria. The report would contain analyses and evaluations necessary to demonstrate that operation of the facility would not endanger the health and safety of the public. We anticipate that the Commission would document its review and approval of the topical safety analysis report in a safety evaluation report which could be referenced in the subsequent interim storage facility licensing proceeding.

REPOSITORY LICENSING

Mr. Myers. If Yucca Mountain is characterized as a suitable site for a geologic repository, will the Department's license application to NRC include - as originally planned--conceptual design, final design for a waste package, and predictions of how well the repository's engineered and natural features will isolate the spent fuel?

Dr. Dreyfus. Yes, with the exception of the waste package design, the listed elements of the license application will be included as originally planned. The waste package design at time of submittal will be at a higher level of design than the repository design but will be between preliminary and construction design.

The repository design will be conceptual, but at variable levels of design, based on three classifications. A small percentage of the repository design will have no regulatory precedence (e.g., dry fuel handling systems); these repository designs will be the most complete of the three classifications. The second classification of repository designs (e.g., ventilation, radwaste treatment, etc.) with regulatory precedence makes up a larger percentage of overall repository design; designs will be less complete at time of submittal. The largest percentage of design items are those subject to standard building code requirements (roads, sanitary systems, etc.); designs will be the least complete of the three classifications.

Mr. Myers. What regulatory changes are necessary or desirable to streamline the licensing process and contain system costs?

Dr. Dreyfus. The Department of Energy (DOE) is reviewing 10 CFR Part 60 to identify changes to the regulations that would streamline the regulatory process and enable the DOE and NRC to focus on those issues that are most important to protecting public health and safety and that are pertinent to the Yucca Mountain site. The review is focused on addressing two concerns: (1) implementation of the reasonable assurance concept and (2) regulations that DOE believes to be overly prescriptive.

The DOE believes the statutory and regulatory framework that is in place for licensing a high-level waste repository allows the DOE to submit a docketable license application to the NRC based on limited geologic and design information. This belief is supported by the DOE's interpretation of the regulations in Part 60 and by research into the original NRC Statements of Consideration accompanying Part 60. It is also supported by review of the Nuclear Waste Policy Act and records of Congressional deliberations regarding that Act. However, the DOE is concerned that some of the rules that make up the regulatory framework are subject to interpretation regarding the level of certainty required.

The DOE is also concerned that overly prescriptive regulations may limit our options for demonstrating that the proposed repository would adequately protect public health and safety. The regulations should focus on overall system performance objectives. Meeting these objectives provides reasonable assurance that the health and safety of the public are protected.

Mr. Myers. The process for reaching a "site suitability decision" was established prior to the enactment of the Nuclear Waste Policy Act Amendments of 1987, which vitiated the need to characterize multiple potential sites. Do you believe that the requirements for this process, which was conceived as a means to help choose between different sites, should be eliminated or modified?

Dr. Dreyfus. The Department is examining modification of the suitability process and is currently developing a Notice of Proposed Rulemaking for revision of 10 CFR Part 960, the siting guidelines that established the site suitability process in response to the 1982 Nuclear Waste Policy Act. These revisions will conform the rules to the current statutory framework and would eliminate a need for both the vitiation of the comparative aspects of the suitability process in the Nuclear Waste Policy Amendments Act of 1987 and the remanding of the EPA standards for 40 CFR Part 191.

Mr. Myers. What will the suitability process accomplish that would not otherwise be accomplished by the NRC licensing process?

Dr. Dreyfus. The proposed revisions to 10 CFR Part 960 will reflect the intent of the Department to streamline the program, including the regulatory compliance process, to focus more effectively on the performance of a repository at Yucca Mountain for protecting public health and safety.

Mr. Myers. If the suitability process were eliminated, what impacts would that have on program schedules and costs?

Dr. Dreyfus. The program schedule and cost impacts from elimination of the suitability process would be minimal. The program relies on a single technical baseline to develop the information needed to satisfy its regulatory mission for suitability, the National Environmental Policy Act, and licensing. As currently envisioned, the 10 CFR Part 960 Compliance Report will present a suite of succinct compliance arguments focused on site-specific issues with technical bases established by reference to documents already planned within the technical baseline.

Mr. Myers. The Department recognizes that it is, "necessary to rationalize the regulatory structure that guides the licensing of the repository to reflect the experience of the past decade of work." How exactly does the Department propose that this be accomplished?

Dr. Dreyfus. The Department will propose revisions to its siting guidelines that will help communicate our views of the appropriate regulatory framework for evaluating Yucca Mountain. Concurrently with changes to the siting guidelines, we expect the Environmental Protection Agency (EPA) to issue a site specific environmental standard and the Nuclear Regulatory Commission (NRC) to conform its licensing criteria (10 CFR 60) accordingly. The Department will interact with both the EPA and NRC regarding their regulations to ensure they reflect our improved technical knowledge and understanding.

Mr. Myers. What statutory changes are required?

Dr. Dreyfus. We intend to explore this approach and pursue the process with the NRC. We do not anticipate that any statutory requirements will be necessary.

Mr. Myers. What actions can be taken administratively to help rationalize the regulatory structure?

Dr. Dreyfus. As indicated in response to the question above, the Department will soon propose revisions to its siting guidelines.

DIRECT PAYMENTS AND COOPERATIVE AGREEMENTS

Mr. Myers. A draft report of the General Accounting Office categorically states that, "Nevada has inappropriately used federal grant funds to advance, on a national stage, its message of opposition to a repository at Yucca Mountain." Such use is contrary to law, which prohibits the use of federal funds to, "influence legislative action on any matter pending before Congress," and which provides that grant funds were to be used solely for the state's scientific oversight responsibilities. The report goes on to cite specific examples of Nevada's misuse of federal dollars, including the production of a videotape urging young people to: "Speak up. Write your Congressman. Get involved and try to get this thing out of the state of Nevada." Was Nevada's misuse of federal funds taken into account when the Department developed its request for $5 million for the State of Nevada in fiscal year 1997?

Dr. Dreyfus. The findings in the General Accounting Office Report regarding Nevada's use of nuclear waste funds were not part of our considerations in developing the funding request for fiscal year 1997. This request was developed before we reviewed the report.

Mr. Myers. The State of Nevada Legislative auditor conducted an audit of Nevada's Agency for Nuclear Projects for 1995. The agency, which operated almost entirely with federal funds, was found to practice woefully insufficient contracting procedures. Contracts were regularly awarded on a non-competitive basis without solicitation of bids; evaluation and selection of contractors were not adequately documented; and clerical services were purchased for $125 an hour. Did DOE take cognizance of this audit before requesting $5 million for the State of Nevada for fiscal year 1997?

Dr. Dreyfus. OCRWM was made aware of the findings of the State's audit at the time they were widely reported in the press in early March, too late to have any impact on the Fiscal Year 1997 budget request. In any case, that Legislative audit primarily addressed the agency's compliance or noncompliance with State of Nevada procurement requirements and policies. Conversely, provisions within the Nuclear Waste Policy Act and the Fiscal Year 1995 Energy and Water Appropriations Act regarding the State's use of nuclear waste funds specifically address the purposes for which the funds are to be spent.

Mr. Myers. Why has the Department failed to aggressively seek repayment from Nevada for all Nuclear Waste Fund expenditures prohibited by Law?

Dr. Dreyfus. The Department did seek repayment for those expenditures that we determined were made for prohibited purposes, and for which recovery was in the best interests of the government. We presume this question is again based on the recent GAO report regarding the State of Nevada's use of Nuclear Waste Funds. That report addresses $1.054 million in funds that were questioned by GAO in 1990.

We recouped $75,000 of that amount after the contracting officer's determination that those funds had been improperly used for litigation was appealed by the State through the Department of Energy Financial Assistance Appeals Board. This Board affirmed the Contracting Officer's decision. We recouped this money by offsetting that amount from the next fiscal year direct payment to the State. The contracting officer determined that another $395,000 in costs questioned by GAO were allowable.

In addition, $275,000 in grant funds were found to have been spent on allowable activities but were allocated in an unallowable manner. The contracting officer, therefore, determined that it was in the best interest of the government to not attempt recovery of those funds. The State expended the funds, initially provided for use in a subsequent budget period, to pay costs incurred during a prior budget period without the formal approval or authorization of the contracting officer. The contracting officer found that these costs were incurred for otherwise allowable activities and that the grant payment did not exceed any appropriation limitation or ceiling, thus no recovery was attempted. Because of these circumstances and other facts surrounding the expenditure, the contracting officer further determined that to seek recovery would be punitive and inconsistent with the intent of Congress in making those funds available to the State.

Our records show the close-out of $309,000 of 1980 expenditures that were questioned by the GAO in 1990. These funds were expended during the 1980s. Our tracking system shows the matter as resolved; however, we could not locate any information on the expenditure of these funds in our files during the recent GAO review. It is possible that some relevant records are in storage. However, in our judgment it would not be a prudent use of funds to fully explore this matter and attempt to recoup any part of this amount, even if we were able to determine, at this late date, that the funds were misused.

Mr. Myers. Has the Department taken any action to ensure that the state's internal controls over grant funds comply with federal standards? If so, why have these efforts apparently failed?

Dr. Dreyfus. Prior to Fiscal Year 1992, we provided grants to the State of Nevada consistent with the annual Energy and Water Appropriations language. These grants complied with the Department's financial assistance regulations and placed controls on the State as required by those regulations and the language of the Appropriations Acts. Therefore, Federal assistance requirements are no longer placed on the State when it receives direct payments instead of grants. The change to direct payments in Fiscal Year 1992 was intended to reduce the administrative burdens and inevitable friction that results when the agency that awards a grant to enable the recipient to monitor its activities gets to decide what activities it will fund (S. Rep. No. 80, 102d Cong., 1st Sess. 126 (1991)). Each appropriations act that provided for direct payments also required a State certification at year's end that all funds had been used for authorized purposes.

Mr. Myers. Does the Department agree with GAO that it is an inappropriate use of Nuclear Waste Fund payments to establish a, "communications network to coordinate grassroots and national groups fighting nuclear power in the United States"?

Dr. Dreyfus. Yes. We agree that it is inappropriate, under current law, to use Nuclear Waste Fund monies to establish a "communications network to coordinate grassroots and national groups fighting nuclear power in the United States."

Section 116(c)(1)(B) of the Nuclear Waste Policy Act of 1982, as amended (NWPA), provides that the Secretary of Energy shall make grants to the State of Nevada and any affected unit of local government to review, monitor, and conduct oversight activities relating to the Yucca Mountain site as a potential repository, prepare a request for impact assistance to mitigate impacts of site characterization and the development of a repository at the site, provide information to Nevada residents regarding the site, and request information from and make recommendations to the Secretary with respect to such site. Because section 116© authorizes use of these Nuclear Waste Fund monies only for the purpose of these oversight and information activities pertaining to the Yucca Mountain site, to the extent Nuclear Waste Fund monies were utilized for other purposes, such as to "fight nuclear power in the United States," such use would be inappropriate.

Furthermore, the Department's Fiscal Year 1993, 1994 and 1996 Nuclear Waste Fund appropriation acts provided that these funds:

> ...are not to be used to support multistate efforts or other coalition building activities inconsistent with the restrictions contained in this Act.

The restrictions contained in the appropriations acts for Fiscal Years 1993, 1994 and 1995 included prohibitions on the use of funds "directly or indirectly to influence legislative action on any matter pending before Congress or a State legislature or for any lobbying activity as provided in 18 U.S.C. 1913." Therefore, support of multistate or coalition building activities to influence legislative actions pending before Congress or a State legislature would have been inappropriate to the extent such entity utilized Fiscal year 1993, 1994 or 1995 Nuclear Waste Fund monies.

Furthermore, the Fiscal Year 1993 Appropriations Act provides that the use of funds provided thereunder to Nevada and affected units of local government were to be used "for the sole purpose in the conduct of its oversight responsibilities pursuant to the Nuclear Waste Policy Act..." In Fiscal Years 1994 and 1995, the funds were appropriated "for the sole purpose of conduct of its scientific oversight responsibilities pursuant to the Nuclear Waste Policy Act..." Therefore, it would be inappropriate for Nevada or affected units of local government to use Fiscal year 1993 Nuclear Waste Fund monies for activities, such as nationwide information campaigns, outside the scope of the oversight functions described in the NWPA and to use Fiscal Year 1994 and 1995 Nuclear Waste Fund monies for activities, such as nationwide information campaigns, outside the scope of scientific oversight functions described in the NWPA.

Mr. Myers. In 1990, GAO recommended that, "DOE provide timely guidance to Nevada on any congressional restrictions being placed on grant funds and endure that the state has appropriate controls over these funds, but DOE has not implemented our recommendations because it has deferred to the Congress to provide direction to Nevada." How does this square with the traditional notions of our federal government, pursuant to which Congress passes laws and the executive branch administers them?

Dr. Dreyfus. In every Energy and Water Appropriation from Fiscal Year 1992 until Fiscal Year 1995, Congress expressly provided funds for the State of Nevada and directed the Department to fund the State by direct payments. The appropriations also required that the State annually certify that the funds were only used for the purposes authorized by the appropriation language and the Nuclear Waste Policy Act.

The change to direct payments in fiscal year 1992 was intended to reduce the administrative burdens and inevitable friction that results when the agency that awards a grant to enable the recipient to monitor its activities gets to decide what activities it will fund (S. Rep. No. 80, 102d Cong. 1st Sess. 126 (1991)). Each appropriations act that provided for direct payments also required a State certification at year's end that all funds had been used for authorized purposes.

COOPERATIVE AGREEMENTS

Mr. Myers. The Department proposes to fund each and every cooperative agreement funded in fiscal year 1996 at the same level in fiscal year 1997. Hasn't the experience of the last year indicated that some cooperative agreements may be more or less valuable relative to others than was assumed in fiscal year 1996?

Dr. Dreyfus. The Department's cooperative agreements represent a wide diversity of interest groups and stakeholders. While some groups are technical in nature, others represent regional and national stakeholder interests. Since cooperative agreements are created for specific purposes, it is difficult to assess one agreement as having greater or lesser value than another.

Mr. Myers. For each of the ten cooperative agreements, please list the activities funded and the deliverables which must be produced.

Dr. Dreyfus. The activities that the cooperative agreement groups are expected to complete during Fiscal Year 1996 are shown in a listing which I would like to insert in the record. The information follows:

Commercial Vehicle Safety Alliance

1. Update research design data for inspection procedures
2. Inspector training: continue to evaluate and update curriculum and materials, conduct training classes, and conduct periodic refresher training, as necessary
3. Update inspection data collection procedures
4. Develop pre-inspection checklist
5. Initiate and conduct inspections (depending upon availability)
6. Continue data base development, maintenance, and data analysis
7. Exhibit transportation inspection outreach display at national meetings
8. Coordinate with DOE to describe the inspection program to the various Indian Tribes

Conference of Radiation Control Program Directors

1. Review and comment on Program documents, as requested
2. Conduct biannual committee meetings and provide minutes of proceedings
3. Participate in Transportation External Coordination Working Group and other meetings as necessary
4. Prepare videotape, *First Response to Transportation Accidents Involving Radioactive Materials* (completed 12/95); generic radiation risk document; and brochure on high-level radioactive waste transportation
5. Publish and distribute *Directory of State Agencies Involved in Transportation of Radioactive Material, With Notes on their Statutory Authority* (completed 10/95)

Council of State Governments/Eastern Regional Conference

1. Conduct biannual meeting of the Northeast High-Level Radioactive Waste Task Force
2. Prepare white papers on State programs and policies related to the routing, safe routine transportation, and emergency response needs of the Northeastern States as each relates to shipments of high-level waste and spent fuel shipments
3. Prepare Northeast transportation primer

Council of State Governments-Midwestern Office

1. Conduct semi-annual meeting of Midwestern High-Level Radioactive Waste Committee
2. Provide annual updates to: *Midwestern Transportation Primer; Transportation Handbook; Interim Storage Report; Public Participation Study; Emergency Preparedness and Response;* and *Transportation Infrastructure Report*
3. Prepare highway routing document pertaining to the Midwestern states

League of Women Voters Education Fund

1. Prepare article relative to the Program for publication in *The National Voter*
2. Prepare two League of Women Voters Education Fund issue briefs on topics related to the Program
3. Award a third round of pass-through grants to local and State Leagues to develop community education projects on nuclear waste issues
4. Attend the Program's 1996 International High-Level Waste Management Conference and other pertinent national meetings/conferences
5. Produce a publication designed to help community leaders organize objective educational programs on nuclear waste issues

National Association of Regulatory Utility Commissioners

1. Monitor and review Program components
2. Provide stakeholder and interested party consultation
3. Arrange conferences and technical forums
4. Attend Department of Energy meetings, Programs/Project reviews and site visits
5. Provide information on meetings of relevant groups and organizations.

National Conference of State Legislatures

1. Publish bimonthly newsletter on high-level radioactive waste issues
2. Conduct annual national meeting (Milwaukee, WI, July 16-21, 1995)

3. Conduct biannual meeting of the Legislative Working Group on High-Level Radioactive Waste Interim Storage and Transportation
4. Provide technical assistance to state legislatures as necessary on matters pertaining to high-level radioactive waste
5. Provide information and educational assistance on high-level waste issues

National Congress of American Indians

1. Provide information to individual Tribes through the National Indian Nuclear Waste Policy Committee
2. Foster tribal involvement in spent nuclear fuel and radioactive waste transportation issues:
    - Department/tribal regulatory authority involvement (for example, research tribal regulatory authority and develop a sample tribal transportation regulatory code)
    - conduct radiological emergency response workshops and provide comments to the Program on Section 180(c), Nuclear Waste Policy Act implementation procedures
3. Tribal involvement in Federal and non-Federal interim storage issues

Southern States Energy Board

1. Conduct semi-annual Radioactive Materials Transportation Committee meetings
2. Publish/update regional transportation report
3. Provide information to the public through the bimonthly *Radioactive Waste News and Publications* Newsletter
4. Provide comments on training requirements for Section 180(c), Nuclear Waste Policy Act, and for emergency response and safe routine transportation in the southern states
5. Update *Lessons Learned by Southern States in the Transportation of Radioactive Materials*

Western Interstate Energy Board

1. Conduct semi-annual meeting of the High-Level Radioactive Waste Committee
2. Provide regional spent fuel and high-level radioactive waste transportation information
3. Monitor Departments Section 180(c), Nuclear Waste Policy Act (NWPA) assistance development effort
4. Monitor topics related to NWPA shipment routing
5. Maintain awareness of developments regarding inspection/enforcement procedures for commercial vehicles transporting spent nuclear fuel or high-level waste
6. Work on comprehensive transportation planning for NWPA shipments

7. Maintain awareness of developments in authorizing and constructing an interim storage facility
8. Maintain awareness of developments in the Waste Isolation Pilot Plant program

Mr. Myers. Generally, how does the Department assure rigorous monitoring and oversight of cooperative agreement funds?

Dr. Dreyfus. Each cooperative agreement organization submits annual proposals that are subjected to rigorous technical and cost analyses. To facilitate Departmental oversight, each cooperative agreement group submits all regulatory required financial reports, as well as quarterly reports on the activities completed that quarter, and those activities planned for completion for the following quarter. In addition, a program representative attends the Program-related meetings sponsored by each group.

Mr. Myers. Please list every affected unit of local government which has received funding through the Nuclear Waste Policy Fund since 1987.

Dr. Dreyfus. Since 1987, the following affected units of government have received funding through the Nuclear Waste Fund: the State of Nevada; Churchill, Clark, Esmeralda, Eureka, Lincoln, Lander, Mineral, Nye, and White Pine Counties within the State of Nevada; and Inyo County within the State of California.

OVERSIGHT GRANTS

Mr. Myers. Please provide the amount received by each affected unit of local government for each year since 1987.

Dr. Dreyfus. The recipients of financial assistance and the amounts provided since Fiscal Year 1987 are shown in a table which I would like to insert in the record. The information follows:

Oversight Grants
(Whole Dollars)

Recipient	FY 1987	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996
State of Nevada	9,452,111	7,746,552	11,000,000	5,000,000	5,079,000	5,000,000	5,000,000	5,500,000	11,500,000	0
Churchill County	0	0	0	0	0	70,000	111,386	200,000	200,000	0
Clark County	0	0	3,509,876	2,790,000	2,637,710	1,508,550	2,227,722	2,430,000	2,430,000	0
Esmeralda County	0	0	0	0	0	125,000	185,644	210,000	210,000	0
Eureka County	0	0	0	0	0	70,000	148,515	200,000	200,000	0
Lincoln County	0	0	582,358	410,911	478,779	372,900	475,248	544,000	544,000	0
Inyo County, CA	0	0	0	0	0	135,000	289,604	386,000	386,000	0
Lander County	0	0	0	0	0	70,000	111,386	200,000	200,000	0
Mineral County	0	0	0	0	[illegible]	70,000	111,386	200,000	200,000	0
Nye County	0	0	1,031,000	1,720,918	1,902,349	1,508,550	2,227,723	2,430,000	2,430,000	0
White Pine County	0	0	0	0	0	70,000	111,386	200,000	200,000	0
Total	9,452,111	7,746,552	16,123,234	9,921,829	10,097,838	9,000,000	11,000,000	12,500,000	18,500,000	0

Payments Equal To Taxes
(Whole Dollars)

Recipient	FY 1987	FY 1988	FY 1989	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994	FY 1995	FY 1996
State of Nevada	0	0	0	0	0	0	0	204,517	967,081	440,000
Nye County	0	0	0	0	0	1,000,000	2,000,000	4,400,000	7,400,000	5,400,000
Inyo County	0	0	0	0	0	0	0	14,331	7,720	2,200
Esmeralda County	0	0	0	0	0	0	0	2,028	1,251	400
Clark County	0	0	0	0	0	0	0	81,648	105,259	8,000
Lincoln County	0	0	0	0	0	0	0	4,209	2,962	900
Total	0	0	0	0	0	1,000,000	2,000,000	4,706,733	8,484,273	5,851,500

CASKS AND CANISTERS

Mr. Myers. Please discuss the Department's decision to terminate the multipurpose canister (MPC) program.

Dr. Dreyfus. Due to funding reductions, the Office of Civilian Radioactive Waste Management will not pursue further development of a multi-purpose canister system for transporting and disposing of spent fuel. The Department of the Navy, which had been a cooperating agency on the environmental impact statement for the multi-purpose canister system, has become the lead agency and will proceed with the part of the environmental impact statement covering naval spent fuel.

Mr. Myers. Is the Department satisfied that adequate canisters will be commercially available for the transportation, storage and disposal of spent fuel at such times as the Department begins to accept waste from generators?

Dr. Dreyfus. The Department has begun an initiative to privatize the development and acquisition of the required spent fuel transportation and storage hardware and related services through the use of a market-driven strategy. In response to this mechanism, the Department believes that the private sector will develop adequate canisters and associated equipment to meet its waste acceptance needs. Without this market driver, the private sector may continue to respond to current utility needs for on-site dry storage canisters on a cost competitive basis. This may result in canister designs that are not optimal for later transport to or use at a Federal facility without repackaging.

Mr. Myers. How do you plan to assure standardization of canisters or their compatibility with the repository system?

Dr. Dreyfus. The Department believes that the market-driven strategy will encourage greater standardization of equipment used for transportation and storage of spent fuel. Cost competitiveness and operating efficiencies will also drive the market toward a large measure of standardization. The development of canisters compatible with ultimate disposal will await the evolution of both the repository design and the institutional arrangements for procurement.

Mr. Myers. Please discuss the current state of commercial canister development.

Dr. Dreyfus. Commercial canister development activity is currently driven by competitive pricing to develop canisters which are the most cost efficient. They are designed and licensed for a specific reactor's spent fuel parameters and, therefore, have limited application at other sites. Several vendors are developing dual purpose (storage and transport) canisters, for specific needs of a few utilities; however no one has received Nuclear Regulatory Commission certification or placed such a canister into service. The Department believes that the market-driven acquisition strategy may provide the incentive that the private sector needs to bring the dual or multi-purpose canisters to the marketplace.

Mr. Myers. Does the Department plan to transfer to the private sector technology that has been developed in the now-canceled MPC program? If so, will this transfer be accomplished?

Dr. Dreyfus. The Department plans to make technology developed during execution of the multi-purpose canister contract available to all interested parties in the private sector. The multi-purpose canister design procurement specifications are now available and are being considered by vendors in developing their commercial canister systems. The Department has not completed its detailed plan for releasing this technology to the private sector.

Mr. Myers. Please evaluate your tests of a fabricated truck cask model.

Dr. Dreyfus. The design verification testing of the GA-4 half-scale cask model was successfully completed during the last quarter of 1995. The test program was divided into three regulatory test sequences designed to envelop the most critical accident conditions. Each test sequence consisted of a 30-foot drop followed by a 40-inch puncture drop. Following each test sequence, the cask was pressure tested and closure seals were leak tested to verify that containment integrity was maintained. The cask was also visually and dimensionally surveyed for damage.

Mr. Myers. What weaknesses, if any, were revealed by the testing?

Dr. Dreyfus. The testing did not reveal any design weaknesses in the cask; the half-scale model performed as expected. The test results correlated well with the performance predicted in the Safety Analysis Report which was submitted to the Nuclear Regulatory Commission in 1994. A complete test report documenting the results of the half-scale model testing program is being completed by the design contractor.

YUCCA MOUNTAIN

Mr. Bevill. The Department, the Nuclear Waste Technical Review Board and others have stated that an interim storage site should not be named until after a permanent site has been chosen. Does your definition of "chosen" rely on a positive viability assessment or does it refer to a final licensing decision by the NRC?

Dr. Dreyfus. The Administration's position is that the siting of any interim storage facility should be informed by the probability of a feasible repository. We believe that assessment will be completed in 1998, and will provide a better understanding of the repository design and its performance in the geologic setting, a better appreciation of the remaining work needed to prepare a license application, and a more precise estimate of the cost of a repository. The assessment constitutes a logical convergence point at which we can make a measurably improved judgment of the prospects for geologic disposal at the Yucca Mountain site and present this information to the Administration and Congress.

Statement of Richard J. Guimond

Assistant Surgeon General, USPHS
Principal Deputy Assistant Secretary for Environmental Management
Department of Energy

before the
Subcommittee on Energy and Water Development
of the
Committee on Appropriations
U.S. House of Representatives

March 26, 1996

Statement of Richard J. Guimond
Assistant Surgeon General, USPHS
Principal Deputy Assistant Secretary for Environmental Management
Department of Energy
FY 1997 Appropriations Hearings

Mr. Chairman, and Members of the Subcommittee, I appreciate this opportunity to appear before you to discuss the Department of Energy's Environmental Management (EM) program and its Fiscal Year (FY) 1997 budget request. Last year, Assistant Secretary Grumbly appeared before you to say that we had "turned the corner" on addressing the legacy left behind by fifty years of nuclear weapons production. This year I am pleased to report real results -- not only results "on the ground" -- but also in a new way of doing business. Clearly, we still have a long way to go; but, we are on our way.

Today I would like to:

- Describe the Environmental Management program and present some of our significant accomplishments from the past few years.
- Present an analysis of the budget requests for each program area, explaining the major activities and accomplishments for each program.
- Review our commitments for our Fiscal Year 1997 budget, and outline the strategy and vision for the future of this program and its mission.

INTRODUCTION

For the second straight year, in Fiscal Year 1997, the Department is submitting a budget for the Environmental Management program that represents a reduction from the previous year given a comparable scope of work. Under our proposed Fiscal Year 1997 budget, we will continue to contribute to a leaner federal government by doing more work with less money. We have succeeded in driving down the costs of our program while increasing our productivity. We implemented enormous changes in the program when I took this job in 1993 and the results of those changes are well represented in this budget. Our Environmental Management Fiscal Year 1997 budget request under the Defense Environmental Restoration and Waste Management appropriation aggressively addresses and minimizes risk to workers, the public and the environment; effectively prioritizes and sequences work covered by Federal and state agreements to incorporate relative risk; invests in mortgage reduction opportunities to continue to reduce the overall cost of the material and facilities within the Environmental Management program; and focuses on obtaining measurable results.

The Department is requesting $5,878,376,000 in new budget authority for Fiscal Year 1997, about $200,000,000 less than the enacted Fiscal Year 1996 appropriation. This request represents a 3.4 percent reduction in funding from Fiscal Year 1996. An additional $182 million is being proposed in the government wide general provisions in the *Appendix* volume of the President's Fiscal Year 1997 Budget to provide up-front funding for additional Environmental Management privatization efforts. This request, in addition to the direct budget request for the Department's Environmental Management program, will support our efforts to privatize certain operations to save money through a new way of doing business.

Included in this year's budget request is significant funding for privatizing a number of operations, including the largest privatized operation ever undertaken -- the Hanford Tank Waste Remediation. We intend to release the draft Environmental Impact Statement for the Hanford Tank Waste Remediation in the next couple of weeks with a preferred alternative that reflects our legal commitments and our commitment to the health and environment of the Pacific Northwest. As you know, we have already released a Request for Proposals for this bold new initiative and have received substantial interest from private industry. We intend to go forward with the awarding of a contract for this initiative after Congress has given some indication of support for our Fiscal Year 1997 budget. We hope that Congress will expeditiously support our entire Fiscal Year 1997 budget and will particularly support our privatization initiatives.

While we believe we can continue to meet our goals and achieve significant reductions, there are limits to how much our budget can be reduced without sacrificing results. Roughly 65 percent of our budget is driven by the legal and moral obligation to comply with applicable laws and agreements. Moreover, our basic responsibilities -- securely storing the essential elements of nuclear weapons production and reducing the environmental mortgage of the Cold War -- demand that we continue to meet our obligations as completely and cost-effectively as possible

BACKGROUND ON THE ENVIRONMENTAL MANAGEMENT PROGRAM

The "Environmental Management" is often referred to as the "cleanup program " This terminology unfortunately may lead to a misunderstanding about are real responsibilities. Some of the highest priority tasks have little to do with what one traditionally thinks of as "cleanup." For example, we are responsible for the safeguards and security as well as the safety of more than 20 metric tons of weapons usable plutonium. Moreover, unlike many hazardous chemical wastes, radioactive waste cannot simply be broken down into constituents elements; it requires isolation from the environment through treatment and/or disposal while it decays. We are undertaking significant disposal operations to deal with the waste permanently, although long-term land use control may continue to be required after disposal. In other cases it is neither technically possible nor prudent from a safety or financial perspective to attempt to eliminate or remove the waste and contamination. In these cases, it may be more appropriate to stabilize and monitor the waste where it is. Hence, the "nuclear materials safety and stewardship" program may be an apt description for much of our program.

The industrial infrastructure used for producing and maintaining our nation's nuclear weapons deterrent was massive. Factories, laboratories, and thousands of square miles of land were devoted to the successful enterprise of producing tens of thousands of nuclear weapons in the name of national security. This enormous infrastructure still exists and is largely being maintained by the Environmental Management program.

It is difficult to communicate the size and variety of the tasks being addressed by the Environmental Management program. A map of the facilities for which the Environmental Management program is now responsible includes the basic facilities used for weapons material production -- the Savannah River Site, the Hanford Site, the Idaho National Engineering Laboratory, the Rocky Flats Environmental Technology Site -- as well as numerous smaller facilities: Tonawanda, Fernald and old uranium mill tailings sites. Like most industrial efforts, the nuclear weapons complex generated waste. The problems posed by the weapons complex, however, are unique as they include unprecedented volumes of contaminated soil and water, radiological hazards from special nuclear materials, and a vast number of contaminated structures ranging from chemical plants to evaporation ponds. Also, the business practices used during production of nuclear weapons are no longer appropriate.

Last year, we estimated the cost for stabilizing and cleaning up these facilities to be approximately $200 billion with a range of $170 to $350 billion, depending on the expected future land use and project efficiency. We are now completing a more detailed update of that estimate. This effort should provide a much better estimate because of improved life-cycle cost analysis capabilities in field offices. We are using these results to help drive down the life-cycle costs of the program. Regardless of the specific details, it is clear that it is the largest environmental stewardship program in the world. It is also clear that this challenge warrants serious attention to the technologies and business methods necessary to ensure that the job is done in the smartest and most cost-effective manner possible.

As a result of the abrupt cessation of new nuclear weapons production operations in the late 1980's, we not only have inherited a legacy of thousands of contaminated areas and buildings, and huge waste volumes, but we also have responsibility for large amounts of nuclear materials still "in the pipeline" of their production processes. For example, the program stores approximately 25 metric tons of plutonium, which pose extraordinary safety and security obligations. This quantity of plutonium is sufficient to fabricate thousands of nuclear weapons, so the security as well as the safety of this material is of paramount importance. Moreover, plutonium can spontaneously ignite in contact with moist air in certain circumstances, thereby requiring careful attention to handling and storage safety. We believe that our primary job is to address these most immediate, urgent risks to human health and the environment as well as manage the long-term contamination and safety threats, reducing the long-term mortgage passed on to others.

We are the "landlord" of numerous large sites around the country, some of them are essentially small cities. This means that roads, electrical power, food services for employees, fire and emergency services -- everything that it takes to safely and efficiently manage these sites -- are our responsibility.

The Environmental Management program manages risks and addresses issues such as:

- hundreds of large, underground high-level radioactive waste tanks, some of which have leaked, and some of which may pose a danger of an explosion unless properly managed;
- the need for security to prevent theft or diversion of nuclear weapons material (e.g., plutonium and highly enriched uranium) and sabotage of nuclear facilities,
- vast quantities of surplus nuclear weapons material which need to be stabilized since they pose a risk to the public, our workers and the environment in their current state;
- thousands of metric tons of highly radioactive spent nuclear fuel, some corroding in various types of storage;
- thousands of radioactively contaminated buildings that must be deactivated and eventually decontaminated;
- over one half million cubic meters of solid and liquid wastes safely stored awaiting treatment and/or disposal.
- contaminated drinking water, soils, and surface water;
- the potential for worker exposure to radiation and chemicals; and
- the need to safely transport large amounts of hazardous materials, on-site or between sites.

Establishing priorities among such diverse risks and complex requirements has proven to be a major managerial and technical challenge. We are proud of our accomplishments in this area. In budget terms, this means that funding is required simply to prevent risks from emerging or increasing. Additional funding is required to further eliminate the source of potential risks -- the untreated wastes and nuclear materials. This work does not occur in a regulatory vacuum. As a federal entity, we have significant legal and regulatory obligations. In addition to federal and state environmental and safety laws and regulations, this program operates within a complicated framework of other commitments and expectations, which include the following:

- Defense Nuclear Facilities Safety Board Recommendations;

- Worker safety and health protection expectations derived from nuclear industry practices and Departmental orders;
- Short- and long-term technology development needs;
- International Atomic Energy Agency nuclear nonproliferation safeguards requirements;
- Compliance agreements or court orders; and
- Worker and community transition needs (e.g., training and land reuse).

Finding cost-effective ways to address these issues now rather than deferring solutions to later generations has been the goal of Congress and this program. In fact, this notion of "responsible stewardship" was one of the primary issues raised by the National Academy of Sciences (NAS) in their recent review of the Environmental Management program. As part of our efforts to ensure that we are moving in the right direction, we requested the NAS to review the overall Environmental Management program and to make recommendations for improvement. We welcome their findings and recommendations, recently released in the report, Improving the Environment. The NAS focused on priority setting, science and technology issues, and regulatory measures. They concluded that a number of our program's initiatives "are rapidly introducing change into a system that was established during the Cold War" and that our "principles and general direction are encouraging." Despite the strides we have made, the NAS points out -- and we in the Environmental Management program acknowledge -- areas that need improvement. Shortly, we will provide a formal response to the NAS report, including specific plans to continue improving the management of this program. In addition to the NAS report, the Office of Environmental Management is developing a strategic plan that will be issued in early summer. The strategic plan articulates a mission and vision, defines key management initiatives that the program will pursue in the next year and beyond, and sets forth a process for prioritizing our activities. The Environmental Management program is committed to, and is increasingly successful in, cost-effectively addressing the environmental and safety problems of the Cold War legacy.

PROGRESS IN ACCELERATING CLEANUP AND CUTTING BUREAUCRACY.

This program, like many government programs, has had its share of startup problems. Not created from whole cloth but assembled from ongoing duties and budgets of existing Department of Energy programs, the Environmental Management program was initially ill-equipped to handle its tasks. The Environmental Management program has grown since its creation in 1989, largely through the addition of responsibility for newly declared surplus facilities. In 1989, the program assumed full responsibility for Fernald. Soon Hanford, and the Idaho National Engineering Laboratory, were added to the program. In 1993, the Rocky Flats Plant was added. And last year the Mound Site, the Pinellas Plant, and most of the Savannah River Site were added to the overall management responsibilities of the Environmental Management program. Now, the facilities under this program's purview are located in more than a dozen states and cover more than a thousand square miles. In 1993, the Environmental Management program established six strategic goals both to guide our efforts and to serve as yardsticks for measuring progress.

The six goals are:

- to eliminate and manage urgent risks;
- to assure worker safety;
- to improve managerial and financial control;
- to demonstrate tangible results;
- to focus technology development to get results; and
- to establish a stronger partnership through greater public involvement in Departmental decisions.

These goals, that Assistant Secretary Grumbly established when he arrived, have brought tangible results, including shedding inappropriate contracting and operating practices of the past, cutting unnecessary overhead, and getting real results in reducing risks. Since October 1993, we have reduced the number of contract employees by 20,000 to better fit our workforce with the mission and reflect our budget levels.

Let me report to you some specific examples of meeting goals.

Goal 1: Reduce Urgent Risks

In 1993, we identified three urgent risks that existed at several sites: unstable plutonium, high level waste tanks, and corroded spent nuclear fuel and targets. Each of these was very serious and could have resulted in a catastrophic accident or serious worker injury without focused attention. We have succeeded in eliminating, or taken the initial steps toward elimination of, each of these urgent risks.

- The Savannah River Site Defense Waste Processing Facility -- the largest high level nuclear waste vitrification facility in the world -- started operations on March 12, 1996.
- At the Savannah River Site, we restarted the F-canyon and have stabilized over 36% of the liquid plutonium nitrate solutions, which posed a threat of a criticality or leakage if

left unaddressed.

- Also at the Savannah River Site, we restarted the dissolution operation and began dissolving and reprocessing the Mark 31 targets, which are among the most corroded materials in storage.

- We have made substantial progress at Rocky Flats towards stabilizing the unstable plutonium that has been stored in glove boxes since production shut down in 1989. For example, workers have treated approximately 30 kilograms of unstable plutonium metal and oxides in a controlled oxidation furnace, which creates a stable form for interim storage awaiting final disposition. Approximately 30 kilograms remain to be stabilized.

- At the Hanford Site in Washington, we have virtually eliminated the risk of a tank explosion from the buildup of flammable gases by installing a state of the art pump, which has exceeded design expectations in its first two years of operation.

- At the Hanford site, the project to remove the deteriorating spent nuclear fuel from the aging K-Basins located near the Columbia River is well underway. The fuel is expected to be removed by the end of 1999 and placed in dry storage in a new Canister Storage Building. The fuel will be conditioned in a form suitable for safe, long term, interim storage.

- Risks from the unknown are almost as great as the risks we do know about from these high-level liquid waste tanks at Hanford. We have made substantial progress toward characterizing the waste in these tanks, which are much less well known than the waste in the tanks at the Savannah River Site. Characterizing the waste is necessary before treating it. Recently, some have criticized the Department for not meeting our characterization goals. What many of our critics fail to understand, however, is that this operation involves cutting-edge science and engineering, and is extremely hazardous in an area with little room for error. I will not sacrifice worker safety to meet artificial quotas. Nonetheless, I am happy to report that after completing our initial learning and technology development experience, we are making much more rapid progress toward the characterization of these tanks.

- Also, at Rocky Flats, we have stabilized approximately 1,900 liters out of 31,000 liters of plutonium solutions. To eliminate the generation of flammable hydrogen and to remove organic compounds which could become flammable, workers have safely repackaged 221 plutonium metal units that were in contact with plastic and are currently in the process of repackaging approximately 1,600 units that are in proximity to plastic.

- At Hanford, we have developed and begun using two technologies to stabilize plutonium materials more quickly and less expensively than with traditional processing methods.

We have completed the stabilization of reactive plutonium scrap and incinerator ash.

- We have completed the venting/repackaging of plutonium solids at the Savannah River Site as recommended in the Department's Plutonium Vulnerability Study.

- In compliance with a consent order to the State of Idaho, the second lot of 189 spent fuel units were transferred from inadequate storage facilities to ones meeting current safety standards three months ahead of schedule. And we are well on our way to finishing the transfer of the last lot of spent fuel to proper storage facilities.

- Approximately 2,700 residue drums were vented to eliminate pressure build up and flammable hydrogen accumulation at Rocky Flats.

Vulnerability assessments led by the Office of Environment, Safety and Health identified shortcomings in the way we handle spent fuel, plutonium and hazardous chemicals that could affect the public or worker health or the environment. Overall, 281 of 503 corrective actions identified in the spent fuel report have been completed and 64 of 152 plutonium milestones have been met. We are aggressively developing actions and implementing them to remediate the most urgent risks in the complex.

The Office of Environment, Safety and Health's independent oversight program has also been extremely useful in effectively targeting risk. The comprehensive assessments have provided DOE management with validated, professional appraisals of the site's performance, greatly aiding our ability to target resources to areas of greatest risk to workers, the public, and the environment. The foundation of the new approach is an analytic framework or "template" that clearly articulates the principles and operational elements of sound Environment, Safety and Health management programs. The assessments have identified where we are doing well, where we have to work harder, and also aid in spreading good practices among our sites.

GOAL 2: Emphasize Health and Safety for Workers and the Public

Along with working to protect public health and the environment, protecting the safety of our workers is the highest priority. It would be unacceptable to sacrifice worker health and safety in an effort to protect the public health and the environment for future generations. Our workers face risks unlike any others in this country, and we owe them -- many of whom are also veterans of the Cold War -- a large debt of gratitude. Recognizing the critical role site workers play in our success, we have refocused efforts to ensure a safe and healthful workplace Three years ago, the rate of lost work days was about 59 per 200,000 person-hours in Environmental Management operations. Today, we have cut that figure by 45 percent. This means not only fewer individuals injured but also a more productive working environment. By focusing managers and training workers, and by discarding duplicative and cumbersome orders, we have been able to get more work done in a safer manner.

The Office of Environmental Management has worked in partnership with the Office of Environment, Safety and Health to provide line program managers with tools to manage safety at our facilities more effectively and at less cost to the taxpayers. Through several joint projects, we have shown that we can do our work better, more safely, and at less cost by integrating safety and health professionals into the planning and execution of our work. We view safety as an asset that allows us to target our most urgent risks, use our limited resources most efficiently, and do our work most effectively.

At Fernald, for example, we avoided nearly $2 million in costs by recognizing and avoiding unnecessary work. This was because safety and health personnel worked side by side with engineers, planners, and other workers to "build in" safety and health concerns during the actual planning of work. In much the same way, we saved $500,000 through early identification and control of hazards at a Hanford plant. We expect this approach to become standard practice throughout the DOE complex and continue to save money while safeguarding worker health and safety.

Some of the Department's rules and orders no longer meet the needs of many of our facilities. These "top down" orders were developed to meet the needs of a stable weapons production system. Deactivation, decontamination, decommissioning, and environmental cleanup, on the other hand, involve hundreds of individual tasks in aging facilities with hazards that are unknown and difficult to predict. A new process -- the "Necessary and Sufficient Process" -- provides a graded approach to safety standards that allows us to tailor the standards to the work and the facilities. In a pilot application of this process at a major Hanford facility, we were able to greatly reduce worker exposure while cutting costs by 50 percent. We hope to use this process to proceed with safe and timely stabilization of facilities at Rocky Flats and other locations throughout the DOE complex.

We are meeting our worker safety goals and we continue to monitor worker health. For example, the Environmental Management program received an award in 1995 from the State of Ohio for two million person hours worked without a lost time accident at Fernald. The Savannah River Site recorded 9.5 million person hours without a lost work day due to an on-the-job injury. At Hanford, we completed removal and disposal of highly irradiated reactor fuel spacers from underground silos to reduce exposures to deactivation workers at N area. Recently, however, we were soberly reminded that there is more progress to be made in this area. At the Idaho site, a worker died from a fall from construction scaffolding. These tragedies must motivate us to redouble our efforts to provide a safe and healthful workplace.

GOAL 3: Bring the Program into Managerial and Financial Control

One of the most significant achievements of the Office of Environmental Management is that we have brought more budgetary and bureaucratic discipline to this program. Over the first five years of this program, the budget rose exponentially and soon was over $6 billion, with projections for increases to more than $10 billion per year by 2000. By the time Assistant Secretary Grumbly took this job in 1993, this program was in real need of financial restraint. Assistant Secretary Grumbly's predecessor, Leo Duffy, intuitively estimated in December 1992 that one out of three dollars was being wasted. Several months later, the results of a study we commissioned in early 1993 indicated that he was right. The data indicated that our project management costs were substantially higher than both comparable private sector projects and comparable government projects. This situation was unacceptable. Beginning in 1993, we made cost reduction one of the highest priorities.

First, the Administration imposed an overall cap on the growth in the budget for this program. Then we reduced the budget, in real terms. For example, last year's budget request was, in reality, a 4 percent reduction in the budget when viewed against the added responsibilities of managing several of the largest and most complicated former defense nuclear sites. Responsibility for the Savannah River Site, the Mound facility, and the Pinellas Plant were all transferred to our program in 1995. This is clear evidence that the program is committed to doing more with less.

Second, we have integrated information about risks to public health, worker safety, and the environment into the Fiscal Year 1998 budget formulation process. In doing so, we have made an effort to balance risk information with other factors that must be taken into account when setting priorities, making decisions, and allocating resources.

In 1993, Congress was concerned about how the Department was addressing its most pressing problems and establishing priorities among competing environmental management requirements and budgets, and required the Department of Energy to submit a risk report. The Department responded with the draft report, Risks and the Risk Debate: Searching for Common Ground, The First Step, which provides an analysis of the current and proposed risk management activities initiated to reduce risk and fulfill compliance requirements. The report evaluated risks to the health and safety of individual members of the public intended to be addressed by cleanup activities required by compliance agreements. The report also evaluated the health and safety effect of, and the cost associated with, implementing the requirements.

This report provided the first link between budget, compliance agreements and risk activities. Department of Energy field program managers with the relevant expertise categorized the environmental management work. This allowed the Department to understand the spectrum of risks associated with environmental management activities and linked the risks in a qualitative fashion to compliance and budget. After submission of the report in June 1995, with the advice of our external Environmental Management Advisory Board, we began the process of integrating information about risks to public health, worker safety, and the environment into our budget formulation. This process is iterative, and will continue and improve each year as we more fully involve stakeholders and peer reviewers.

Third, we set an immediate goal of a 20 percent increase in measurable productivity; a goal that most Fortune 500 companies would find ambitious. This initial productivity challenge was across-the-board in Fiscal Year 1994. We then set additional productivity goals for individual sites based on their effective use of additional project managers and cost-engineering personnel. We believe we have eliminated most of the "fat" from the program we inherited in 1993.

Fourth, to ensure long-term and systemic improvement in productivity, we began a contract reform initiative to provide incentives appropriate for the new mission. Much of the problem, we have learned, was that the workforce and contracting methods used in the past were simply inappropriate for the new mission of Environmental Management. We also recognized that the skill mix of the workforce for the new mission at many sites was out of balance, and we undertook a significant reduction in unneeded contractor workforces. As this Subcommittee understands, contract employees comprise most of the personnel at our sites. We have had to cut our contractor workforce from a level of approximately 50,000 in 1993 to around 30,000 today. We know that this downsizing has been painful for individuals, families and local economies. We have complied with the letter and the spirit of the requirements of section 3161 of the National Defense Authorization Act for Fiscal Year 1993 to ensure that the contributions of these "veterans of the Cold War" are not forgotten. But times have changed dramatically, and the current and future missions of the Department demand a contractor workforce with the appropriate skills and of the right size. However, we also recognize that we must bring stability to our sites. I want to emphasize again that it is critical that the Congress appropriate all of the President's budget request.

Our contract reform initiative has also been vital to making the transition from a Cold War system to the new missions at many of these sites. Through this initiative, we have fundamentally changed the way contracts are written and awarded for our sites. The tradition of a single prime Management & Operating contractor working at a site for decades, on a cost-plus award fee basis, was dictated by Cold War production imperatives. Today's imperatives are efficiency, progress, and accountability. Our new contracts reward contractor performance. Performance is measured through cost control, safety and real on-the-ground results.

For example, the recently awarded Rocky Flats contract establishes specific results and goals for the contractor, and the contractor will be paid based on the achievement of these results. Fully 85 percent of the contractor's total fee opportunity will be based on performance, while only 15 percent is base fee. The Rocky Flats contract also provides substantial incentives for cost savings by the contractor. Upon validation by the Department of these cost savings, the contractor will receive 35 percent of the cost savings, with half of those savings going directly to employees.

This new approach to contracting will also save money because contracts are being awarded competitively. Within the past two years, the Department has initiated competitions for its for-profit contracts at five of its major sites -- Idaho National Engineering Laboratory, Rocky

Flats, the Nevada Test Site, the Savannah River Site, and Hanford Contractors have pledged savings of approximately two billion dollars in the first two competitively awarded procurements alone -- the Idaho National Engineering Laboratory and the Rocky Flats Environmental Technology Site. In addition, we have changed the way characterization studies and site assessments are handled in the contracts, so that emphasis is placed on doing the actual work, not simply studying the problem. New streamlined study procedures will ensure that problems are properly assessed, without unnecessary research that takes time and costs money

Much of the recent work we have done to reform contracts and improve efficiency is still in the "predicted" or "expected" stage. However, we already have indications that these changes are working. For example, by relying on off-site, private disposal services for the sanitary waste disposal activities at our Savannah River Site, we saved $34 million because we eliminated the need to construct a new facility. At our Hanford site, we reduced financial, administrative, and information management functions which allowed a savings of approximately $60 million. These are real and significant savings, and are indicative of the expectations we have for the future, and demonstrate the real need we have for change.

In addition to these new site management contracts, we have also made good on our commitment to privatize certain operations where it makes financial and programmatic sense In the past two months, we have released Requests for Proposal to privatize major waste treatment facilities at the Hanford and Idaho sites. In both of these efforts, the contractor will not be paid until the treated waste is actually delivered from a predetermined mixture of raw waste feed.

We are also, partly at the insistence of the Congress, capitalizing on opportunities to change the way we carry out administrative programs. We have reduced our headquarters expenditures by over 36 percent, or $140 million, in the last year. This is a 50 percent reduction in support services contracts since Fiscal Year 1995 We believe this reduction was absolutely necessary and appropriate. It also reflects a cut in headquarters staffing, which will result in more than a 40 percent reduction in five years. However, we cannot perform the analytical work worthy of this technologically complex and unprecedented program if we reduce these investments in support services any further. We have also streamlined the Environmental Impact Statement process with a goal of reducing process time from 33 months to 15 months, saving an estimated $26 million over five years. The Department received the 1995 Federal Environmental Quality Award for this effort.

We have substantially reduced the level of our uncosted balances. Uncosted balances are typically the result of standard project accounting, withheld contractor funds until actions are completed, or scheduling slippages to obtain permits During the last two years, we have achieved a reduction of more than a billion dollars in the level of uncosted balances carried by the program, particularly in the operating and capital equipment budget accounts We understand that uncosted balances have been an issue of concern to Congress It must be understood, however, that substantial cuts cannot be taken painlessly by reducing uncosted balances. Uncosted obligations are not "free money" as some believe. These funds are fully committed to ongoing or planned cleanup activity. We are continuing to reduce our uncosted obligations and our current balances are less than previous years. All of these funds have been "obligated" for specific projects, but they will only be "costed" when the project is complete and the bill is submitted by the contractor. When our bills come due, we have to pay them.

Recently, the Office of Environmental Management reported its uncosted balances to staffs of several Congressional Committees and the General Accounting Office. We believe that our methodology was accepted and understood by the Congressional staffs. They applauded the progress that Environmental Management has made in reducing its uncosted balances by nearly 40 percent over the last two fiscal years. Some Congressional committees have expressed concern that we may have reduced our uncosted balance level too much.

Finally, we have undertaken intensive efforts to wring out as much savings as possible at each major site through the use of a management technique known as "work-outs." These involve assembling all of the necessary information and analysis, with the principal decision-makers related to a site, and addressing each of the perceived stumbling blocks to progress, one at a time. The first of these work-outs focused on the Hanford site, and was heralded by all sides -- the State of Washington, the United States Environmental Protection Agency, contractors, site management and Headquarters DOE management - as the breakthrough "St. Louis Blueprint for Action" after the city where it was held. One product from the session was the establishment of a tentative agreement to amend the Hanford Tri-Party Agreement to provide for a single regulator concept. The idea was that only one regulatory agency will be involved in the day-to-day oversight and decision making on specific environmental management decisions.

Another work-out session, for the Savannah River Site, was held in Rock Hill, South Carolina. In this session, the parties agreed to define and implement strategies and tactics to streamline, simplify and improve the effectiveness of the Site's interaction with its regulators. For example, the parties agreed in principle to: a more collaborative approach in establishing and meeting cleanup objectives; adoption of the lead regulator concept for RCRA permitted cleanup; and minimizing duplication between RCRA and CERCLA requirements. Agreement was reached on specific productivity enhancement proposals with savings that could be applied to other site functions. Related cost savings could range from $65 million to $130 million. It is expected that these savings, in part or in whole, would carry over into the out years and depending on the pace of implementation, should yield some savings in Fiscal Year 1996. I am pleased to report that all sides are living up to their commitments in the Rock Hill agreement, resulting in substantial improvements in the operation of the Savannah River Site.

GOAL 4: Demonstrate Results

The Environmental Management program has also proven that it can establish priorities based on risk and get tangible cleanup results for the taxpayers' dollars. We have formally integrated risk-based approaches into our work by mandating that risk prioritization be conducted as part of our site budget guidance. Site managers must now assess the risks at their sites, and develop their budgets accordingly. I would like to call to your attention some of our accomplishments in the last year, both nationally and at specific sites.

Nationally we have:

- Completed 1,225 release sites, making the total of completed sites 2,538, nearly 30 percent of the estimated total number of 8,854 to be remediated. We completed remediation of 25 facilities, making a total of 182 completed facilities, or 20 percent of the 978 facilities that have been accepted into the cleanup program.

- Entered into 29 Consent Orders under the Federal Facility Compliance Act with authorized regulatory agencies for 32 of the 35 sites for which DOE submitted Site Treatment Plans. The cooperative process has resulted in an integrated treatment system across the complex. Through this effort, the estimated costs for treatment were reduced by $600 million. In the near term, we will continue to work with the States to finalize remaining Site Treatment Plans and Orders. In the long-term, we plan to continue the cooperative process and build on the progress that has been made between the Department, its regulators, and the public.

- Completed 119 interim actions, 75 larger-scale cleanups and 17 decommissioning actions, resulting in 5 million cubic yards of mill tailings, soil, and rubble stabilized, contained, or otherwise addressed. To put this in perspective, this amount is enough to cover a hole the size of a football field half a mile deep.

- In Fiscal Year 1995, completed remediation of 6 former industrial processing sites under the Formerly Utilized Sites Remedial Action Program (FUSRAP) and vicinity properties (with 22 out of 46 in the program now complete), and 2 sites where uranium mining and milling once occurred. Remediation of 16 out of 24 Uranium Mill Tailings Remedial Action Project (UMTRA) processing sites is now complete. Remediation was also completed at 57 public and private properties contaminated with uranium tailings from these former processing sites. In addition, three other small sites not included in the FUSRAP or UMTRA programs were completed.

- Continued ongoing treatment of wastewater and hazardous waste at Department sites. We have prepared for disposal 270 cubic meters of transuranic waste, treated 3,500 cubic meters of low-level waste, mixed waste, and disposed of 46,000 cubic meters of low-level waste.

- Initiated pretreatment of high-level waste at the Savannah River Site by processing approximately 400,000 gallons of high-level waste.

- Since its inception, the technology development program has developed a portfolio of 170 new or improved technologies. An ongoing review of 37 of these new technologies revealed that, depending upon the degree of cleanup, at least $15 billion and as much as $20 billion could potentially be saved through the use of just these 37 processes.

At the Hanford Site in Washington, we:

- Consolidated special nuclear material for storage and surveillance, providing cost savings of $2.5 million.

- Removed over 56,000 pounds of carbon tetrachloride from the soil above the ground water, and treated 17 million gallons of groundwater in Fiscal Year 1995.

- Recycled the condensate water in the evaporator system at Hanford and reduced the mixed radioactive liquid waste generation by almost 200,000 gallons per year resulting in an annual savings of $3.6 million. The evaporator is expected to continue in operation for the next ten years.

- Saved $40 million in waste treatment and facility maintenance costs by shipping 185,000 gallons of uranium-contaminated nitric acid from Hanford for reuse in Sellafield, England.

At the Savannah River Site in South Carolina, we:

- Reduced radioactive and hazardous waste generation for a savings of $4.6 million in disposal costs.

- Approved and started radioactive operations at the In-Tank Precipitation Facility. This system is an essential part of treating the 34 million gallons of liquid high-level radioactive waste at the site. It separates the highly radioactive portions of the waste from the low level portions. The low level portion, which constitutes about 90 percent of the volume, is then transferred to the saltstone facility for treatment. The high level portion is being vitrified.

- Transferred 24,000 gallons of high level waste on February 29, 1995 from the In-Tank Precipitation Facility to the Saltstone Facility.

At the Rocky Flats Environmental Technology Site in Colorado, we:

- Emptied the last of five contaminated solar ponds in January, which were filled with low-level radioactive process water.

- Completed construction of a new Centralized Waste Storage Facility five months ahead of schedule and $500,000 under budget.

- Completed venting and aspiration of 518 drums of transuranic and mixed transuranic wastes, leaving 700 to be vented.

At the Mound Plant in Ohio, we:

- Decontaminated, decommissioned and completely removed the 18,000 square foot Special Metallurgical Building previously used as a radio chemical laboratory primarily processing plutonium-238.

- Made available approximately 10 percent of the Mound plant land area (29 acres) for sale or title transfer by obtaining U.S. Environmental Protection Agency and Ohio Environmental Protection Agency concurrence that the land met an industrial risk scenario protective of human health and the environment.

At the Fernald Site in Ohio, we:

- Completed all major Environmental Restoration milestones on or ahead of schedule, including several major removal actions (Plant 1 Ore Silos, Fire Training Facility, Plant 7).

- Determined through successful public involvement future land use, site cleanup levels, on and off-site waste disposal locations, and cleanup priorities.

At the Idaho National Engineering Laboratory, we:

- Deactivated 2 key buildings at the Idaho Chemical Processing Plant (ICPP), saving out-year cost of $24.5 million.

- Demonstrated at full scale the Dig Face Characterization system, an innovative new technology that provides quick, non-intrusive characterization of buried waste in support of retrieval operations. This technology allows "on-the-spot" characterization of soil and waste samples since it performs the analysis as it collects it. This system also reduces risks to workers since characterization can be performed remotely and rapidly to identify any potential hazards.

- Began incineration of low-level mixed waste one month ahead of schedule at the Waste Experimental Reduction Facility.

At the Oak Ridge Site in Tennessee, we:

- Eliminated 90 percent of the low-level radioactive waste generated per year from the Radioactive Material Management Area. Shrinking the radioactive work area resulted in less contaminated protective clothing and saves over $1 million per year in waste disposal and operations costs. The project cost $300,000 and took five months to implement.

- Treated and discharged 100 million gallons of contaminated water.

- Treated 3.1 million pounds of mixed waste at the Toxic Substances Control Act (TSCA) incinerator at Oak Ridge. Cumulatively, we have treated almost 15 million pounds of waste at the TSCA incinerator.

At the West Valley Demonstration Plant in New York, we:

- Completed construction of the Vitrification Facility, the support NOX Facility, and the Load-In Facility. Preparations for radioactive operations are underway, and the first radioactive canister is scheduled to be processed in June of 1996.

GOAL 5: Focus Technology Development

Innovative technologies offer the promise of significant cost savings. We have focused technology development on five major areas: Mixed Waste Characterization and Treatment; Radioactive Tank Waste Remediation; Contaminant Plume Containment and Remediation; Landfill Stabilization; and Decontamination and Decommissioning. Crosscutting activities that apply to all or some of the focus areas are also conducted: Characterization, Monitoring and Sensors; Efficient Separations and Processing; Robotics; and Technology Integration efforts to enhance the focus areas' ability to achieve accepted, commercially available products. In Fiscal Year 1996, in response to Congressional direction, the Department initiated a science program to bridge fundamental and applied technology development research. This program will continue in Fiscal Year 1997. The Environmental Management's risk management activities are also conducted from the Office of Science and Technology.

We must continue to invest in technology development. For example, DOE landfills contain 3 million cubic meters of radioactive and hazardous buried waste. The landfill caps, once believed to be adequate, have breached and pose a potential threat to people and the environment due to migration of dangerous contaminants to the soil and groundwater. New containment technologies consisting of covers and subsurface barriers to limit water infiltration and spread of contaminants are being developed that will prevent migration of all contaminants for time periods consistent with those of long-lived radionuclides.

Of course, work does not end with developing the technologies. Regulatory and stakeholder acceptance of these technologies is paramount to implementation. Also, the states require rigorous validation processes. Through the Western Governors' Association DOIT (Develop On-site Innovative Technologies) committee, an 18-state Interstate Technology and Regulatory Committee was established with the aim of expediting this process. We realized a major accomplishment in April 1995 when four States (California, New Jersey, Illinois, and Massachusetts) signed a Memorandum of Understanding through which these states agree to share information on technologies and to accept participating states' validation work. This saves time and eliminates duplicative work.

During Fiscal Year 1995, 50 new or improved technologies were demonstrated and 24 were made available for transfer for implementation. 13 new technologies were implemented at waste cleanup sites. For instance, ResonantSonic™ Drilling, an innovative drilling technology that increases drill penetration in difficult geologic media and reduces drilling wastes, was used in Hanford, where it achieved greater than 25 percent cost savings over baseline methods. Also, the Rapid Transuranic Monitoring Laboratory, which provides on-site monitoring of contaminated air and soil, was selected for implementation at the Savannah River Site. This system is capable of processing samples in less than one hour at a cost of approximately $30 per sample compared to $200 to $300 per sample using traditional methods.

GOAL 6: Strengthen Stakeholder Partnerships

Dealing openly and effectively with States, Tribes and the public is not only the right thing to do, it is a requirement of doing business successfully in modern America, and it can reduce cost and improve policy. Hence, we have made this a major element of our operations. Here are few examples of our successes in this area.

- The recent, unprecedented agreement negotiated between the Department of Energy, the State of Idaho, and the Department of the Navy regarding spent fuel and radioactive waste issues at the Idaho National Engineering Laboratory (INEL) has succeeded in positively redefining federal and state relations. The solution covering the receipt, storage and eventual removal of spent fuel from Idaho comprehensively addresses national security, future environmental protection, and public funding concerns. The agreement accelerates the cleanup of INEL and simultaneously continues its vital support of the Navy's nuclear propulsion program. We appreciate the Sense of the Congress resolution supporting this agreement that was included this year in the National Defense Authorization Act.

- Working closely with labor unions at the Mound Plant in Ohio, we recently took a bold step to achieve a mutually supportive approach to cost-cutting. This pathbreaking labor agreement provides a new model for site cleanup and closing issues which will simultaneously increase productivity and workforce stability.

- Stakeholders have been a significant part of the 1996 Baseline Environmental

Management Report development process through meetings, workshops, comment periods, newsletters, and national forums.

- We have established a total of 11 Site-Specific Advisory Boards (SSAB) at Fernald, the Grand Junction Projects Office (Monticello, UT board), Idaho National Engineering Laboratory, Hanford, Los Alamos National Laboratory, Nevada Test Site, Oak Ridge, Pantex, Rocky Flats, Sandia National Laboratory, and Savannah River Site. Another SSAB is presently being formed at Paducah and should be in place in the near future.

Citizen participation is an essential part of our decision-making process. Besides enhancing credibility and accountability, it has proven to be economical and effective. For example, after the Fernald Citizens Task Force examined and analyzed conditions at this large industrial site which is comparable in scale to Ford Motor Company's River Rouge plant. They concluded that different parts of the site would be suitable for different future uses. As a result of the collaborative process with the site contractor and the Department, recommendations were made which will save time in completing the cleanup with an estimated one billion dollars in cost savings over the life of the project.

These are only some of the achievements we have realized over the past year. While we can look back at the improvements and solutions, moving forward on our long term goals is of the utmost importance. Accordingly, I will turn now to our plans for the future.

ANALYSIS OF THE OFFICE OF ENVIRONMENTAL MANAGEMENT BUDGET BY PROGRAM AREA

To carry out these diverse tasks and meet our goals, the Environmental Management program is organized into different program offices. Four primary programmatic entities -- the Offices of Waste Management, Environmental Restoration, Nuclear Material and Facility Stabilization, and Technology Development -- carry out the core missions of the Environmental Management program, with assistance from other Departmental support offices. Our Fiscal Year 1997 program commitments, included as an appendix, demonstrate a consistent, results-oriented approach to addressing the legacy of fifty years of nuclear weapons production.

The Department is requesting $5,878,376,000 in new budget authority for Fiscal Year 1997, a 3.4 percent reduction in spending authority compared to Fiscal Year 1996. This budget falls under three separate accounts: the Energy Supply Research and Development Account (roughly 10 percent of the budget); the Defense Environmental Restoration and Waste Management portion of the Atomic Energy Defense Activities Account (roughly 86 percent of the budget); and the Uranium Enrichment Decontamination and Decommissioning (D&D) Fund Account (roughly 4 percent of the budget). Without the offsets that reduce the budget request, the Department's FY 1997 Budget for the Environmental Management Program totals $6,459,324,000. The Department plans to use $150,400,000 of prior year balances in FY 1997.

A Uranium Enrichment D&D Fund deposit of $376,648,000 is budgeted for FY 1997. A total income of $45,900,000 is expected from foreign fees in FY 1997. $8,000,000 will come from the Savannah River Site Pension Refund. The information on the Fiscal Year 1997 budget request follows in Table 1.

TABLE 1
ENVIRONMENTAL MANAGEMENT
Appropriations Summary
(in $ Millions)

APPROPRIATION BREAKDOWN	FY 1996	FY 1997	Percent Change
Defense	$5,557.5	$5,409.3	- 2.7%
Energy Supply	596.9	651.4	+9.1%
Use of Uranium D&D Funds	278.8	240.2	- 13.9%
Contribution to the Uranium D&D Fund	- 350.0	- 376.7	+7.6%
Uranium D&D Fund Foreign Fees	0.0	- 45.9	N/A
Subtotal, D&D Fund	- 71.2	- 182.4	+156.2%
TOTAL	**$6,083.2**	**$5,878.3**	**- 3.4%**

The Fiscal Year 1997 request of $5,878 million represents a 3.4 percent reduction from the Fiscal Year 1996 appropriation.

Note: Does not include $182 million being proposed in the government wide general provisions in the *Appendix* volume of the President's Fiscal Year 1997 Budget to provide up-front funding for additional Environmental Management privatization efforts.

TABLE 1A
ENVIRONMENTAL MANAGEMENT
Comparable Program Summary
(in $ Millions)

	FY 1996	FY 1997	Percent Change
Waste Management			
Defense	$1,916.9	$1,536.7	- 19.8%
Non-Defense	173.5	199.0	+14.7%
Total	2,090.4	1,735.7	- 17.0%
Environmental Restoration			
Defense	1,804.1	1,762.2*	- 2.3%
Non-Defense	361.4	358.2	- 0.9%
Use of Uranium D&D Funds	278.8	240.2	- 13.8%
Contribution to the Uranium D&D Fund	- 350.0	- 376.7	+7.6%
Total	2,094.3	1,983.9	- 5.3%
Nuclear Material and Facility Stabilization			
Defense	915.7	903.8	- 1.3%
Non-Defense	78.6	91.4	+16.3%
Total	994.3	995.2	+0.1%
Technology Development			
Defense	297.9	303.8	+2.0%
Site Operations			
Defense		329.5	
Non-Defense		2.8	
Total	**	332.3	N/A
Environmental Science Program			
Defense	63.9	52.1	- 18.4%
Privatization (Hanford)			
Defense	0.0	185.0	N/A
Policy and Management			
Defense	**	48.2	N/A
Program Direction			
Defense	473.8	446.5	- 5.6%

TABLE 1A
ENVIRONMENTAL MANAGEMENT
Comparable Program Summary
(in $ Millions)

	FY 1996	FY 1997	Percent Change
Use of Prior Year Balances			
Defense	- 377.7	- 150.4	- 60.2%
Non-Defense	- 19.9	0.0	- 100.0%
Total	- 397.6	- 150.4	- 62.2%
Savannah River Site Pension Fund			
Defense	- 37.0	- 8.0	- 78.4%

* Includes $376.7 million for Government contributions to the Uranium Enrichment D&D Fund

** These offices have been established in Fiscal Year 1996 from pre-existing budgets and are proposed as new appropriation accounts for Fiscal Year 1997.

The Environmental Management program's budget is broken down into four primary activity areas. These are the first four shown in Table 1. In Fiscal Year 1997, the budget for the Office of Waste Management is $1,735,676,000, which is about 27 percent of the total budget request. In addition, there is a new line of $185,000,000 item for the Privatization Initiative for the Tank Waste Remediation System at Hanford, 3 percent of the total Environmental Management budget request. As of October 1, 1995, the Office of Waste Management transferred the Spent Fuel program to the Office of Nuclear Material and Facility Stabilization

The Fiscal Year 1997 budget for the Office of Environmental Restoration is $2,360,633,000. Environmental Restoration comprises 36 percent of the Fiscal Year 1997 budget request for the Office of Environmental Management. This past year, the Office of Environmental Restoration took over a substantial portion of the responsibility for the Rocky Flats site. In order to accelerate the closure and cleanup of the site, the majority of the funding for Rocky Flats was consolidated in the Office of Environmental Restoration.

The $355,907,000 budget for the Office of Science and Technology includes $303,771,000 for technology development and $52,136,000 for the Environmental Management Science Initiative. These items represent 5 percent and 1 percent of the total Fiscal Year 1997 budget respectively.

The Fiscal Year 1997 budget for the Office of Nuclear Material and Facility Stabilization is $995,174,000, 15 percent of the total budget As of October 1, 1995, the Office of Nuclear Material and Facility Stabilization transferred the "landlord" responsibilities, including the Mound and Pinellas project offices, to a new office within the Environmental Management Program, the Office of Site Operations. The Office of Site Operations was specifically created to support the road maintenance, fire safety, security, utilities, and all the other essential but less prominent necessities of running our sites. The top priority of the Office of Site Operations is to maintain a safe, reliable, and cost-effective infrastructure and site services.

The new Office of Site Operations has been allocated $332,268,000 in the Fiscal Year 1997 budget, 6 percent of the total. Finally, program direction accounts for $446,511,000, 8 percent of the Fiscal Year 1997 Environmental Management budget and Policy and Management accounts for $48,155,000, or the remaining 1 percent.

Let me briefly describe each office and its budget requests for Fiscal Year 1997.

Waste Management
Budget Request: $1,735,676,000
(27 percent of the total Environmental Management budget)

The Waste Management Program--comprising over a quarter of the total budget request--manages the treatment, storage, and disposal of wastes, and strives to minimize the amount of newly generated wastes. The mission of the Waste Management program is to protect people and the environment from the hazards of Departmental wastes by treating, storing, and disposing of the wastes as quickly as possible.

The safe and efficient management of radioactive and hazardous waste, much of which has been stored at Departmental sites up to 50 years, is a high priority. Currently, Waste Management facilities store and manage approximately 500,000 cubic meters of waste which includes a wide variety of hazardous chemicals and varying levels of radioactivity.

The Department has developed an integrated planning strategy for each of its waste types managed across the DOE complex which includes high-level, transuranic, low-level, mixed low-level, hazardous, and sanitary supporting the waste management mission by focusing on a 10-year horizon. The strategies also incorporate performance measures to evaluate progress on reducing the current backlog of waste through treatment and disposal and the ability to routinely manage newly generated waste.

TABLE 2
WASTE MANAGEMENT AND CORRECTIVE ACTIVITIES
Funding Summary
(Dollars in Thousands)

Defense Activities	FY 1996	FY 1997	Percent Change
Program Management	$73,069	$30,953	-57.6%
Facility Operations and Maintenance	988,321	924,532	-6.5%
New Facilities	357,674	184,945	-48.3%
Defense Waste Processing Facility	184,755	141,945	-23.2%
Hanford Waste Vitrification Plant	526	0	-100.0%
Waste Isolation Pilot Plant	177,700	165,951	-6.6%
Construction	134,901	88,327	-34.5%
Subtotal, Defense	1,916,946	1,536,653	-19.8%
Non-Defense Activities			
Program Management	2,033	1,150	-43.4%
Facility Operations and Maintenance	45,599	57,887	+26.9%
New Facilities	1,081	1,911	+76.7%
West Valley Demonstration Project	115,389	123,601	+7.0%
National Low-Level Waste	2,865	4,958	+73.0%
Solid Waste	450	3,292	+631.5%
Construction	6,097	6,224	+2.1%
Subtotal, Non-Defense	173,514	199,023	+14.7%
TOTAL, WASTE MANAGEMENT	**$2,090,460**	**$1,735,676**	**-17.0%**

Environmental Restoration
Budget Request: $2,360,633,000
(36 percent of the total Environmental Management budget)

The Office of Environmental Restoration, the largest percentage of the Fiscal Year 1997 budget request, is responsible for the assessment and remediation of facilities and land no longer used for nuclear weapons production, as well as other inactive sites. These sites range from contaminated buildings to abandoned or inactive waste disposal sites. It is this portion of the overall Environmental Management program that is often described as the "cleanup" program.

We are continuing to move away from doing studies to engaging in actual cleanup. The environmental restoration work passed a significant milestone in 1995 -- the funding for on-the-ground cleanup work exceeded the amount spent on paper studies and assessment for the first time. Certainly, some investments in studies are necessary to ensure that cleanup funds are spent effectively. However, it was clear in 1993, that the time to “move dirt” and not produce paper had come. Since then, the funding shift has been dramatic. In Idaho, we spent roughly equal amounts ($40 million) in Fiscal Year 1994 on cleanup and assessments. In Fiscal Year 1995, the funding for assessment dropped to $17 million, while the amount spent on cleanup skyrocketed to $85 million. In Fiscal Year 1996, the funding in Idaho for assessments increased slightly to $23 million, while the amount spent on cleanup decreased to $69 million. Now, for Fiscal Year 1997 we are proposing to spend even more on cleanup (nearly $89 million), while our funding for studies will decrease to approximately $18 million.

For the long term, we must fundamentally rethink the wisdom of attempting to remove all contaminated soil. Certainly, we must remove contamination where it is necessary to protect public health and the environment. Depending on what strategy is chosen, widely varying amounts of contaminated material could require exhumation and redisposal. If only a minimum of soil and contamination is removed, we could still generate more than a million cubic meters of material in the next several decades. If we go to the other extreme, and remove virtually all contaminated soil and material for redisposal, as much as 100 million cubic meters of materials could require redisposal. Removing this amount of contaminated material could entail some risks to the workers and to those who would be exposed along any transportation corridors. We should think very carefully before we embark on any strategy without working through its potential consequences for risks and ecological impacts as well as costs.

TABLE 3
ENVIRONMENTAL RESTORATION
Funding Summary
(in $ Thousands)

Defense Activities	**FY 1996**	**FY 1997**	**Percent Change**
Facilities and Sites	$1,804,052	$1,762,194	-2.3%
Subtotal, Defense	1,804,052	1,762,194	-2.3%
Non-Defense Activities			
Facilities and Sites	213,649	224,393	+5.0%
Formerly Utilized Sites Remedial Action Project	73,982	83,079	+12.3%
Uranium Mill Tailings Remedial Action Project	65,946	42,967	-34.8%
Uranium Mill Tailings Groundwater Restoration Project	7,800	7,800	0%
Subtotal, Non-Defense	361,377	358,239	-0.9%
Subtotal, Environmental Restoration	2,165,429	2,120,433	-2.0%
Uranium Enrichment D&D Fund	278,807	240,200	-13.8%
TOTAL, ENVIRONMENTAL RESTORATION	**$2,444,236**	**$2,360,633**	**-3.4%**

Nuclear Material and Facility Stabilization
Budget Request: $995,174,000
(15 percent of the total Environmental Management budget)

The mission of the Office of Nuclear Material and Facility Stabilization is to reduce the high-risk conditions associated with unstable excess nuclear and chemical materials left at former nuclear weapons production facilities and reduce the maintenance costs associated with stabilizing buildings awaiting decontamination or final disposition. This involves the protection of workers and the environment from exposure and contamination, the stabilization of hazardous nuclear and chemical materials, deactivation of facilities to attain the lowest surveillance and maintenance costs, and transfer of facilities to the Office of Environmental Restoration for decontamination and decommissioning. This program area is responsible for some potentially severe risks: unstable plutonium and spent nuclear fuel.

Last year, the Environmental Management program's responsibilities in the Nuclear Material and Facility Stabilization program area essentially doubled as the result of transferring the responsibility for the Savannah River Site in South Carolina, the Mound Site in Ohio, and the Pinellas Plant in Florida from the Office of Defense Programs to the Environmental Management program, as well as approximately fifty high-risk facilities at other sites in several states. One of the reasons the Office of Nuclear Material and Facility Stabilization's budget request has remained stable is because of fewer expected facility transfers in Fiscal Year 1997.

This year, the Department transferred responsibility for spent nuclear fuel management from the Office of Waste Management to the Office of Nuclear Material and Facility Stabilization. This transfer reflects the fact that much of the spent fuel will require some type of stabilization before final disposal. Spent nuclear fuel management is a critical component of the office's duties. There are approximately 2,700 metric tons of highly radioactive spent nuclear fuel currently in storage among the Department's sites. Much of this is in deteriorating condition since it has been in storage far longer than planned. In some cases, the risks to workers and potentially the public are urgent, because corroding fuel elements can release radioactivity into the storage pool water and possibly to the environment. The Office of Nuclear Material and Facility Stabilization now has the responsibility for safely managing the Department's spent nuclear fuel.

A vital role of this office is to maintain, and when appropriate utilize, the capability for reprocessing spent fuel. This technology was used to extract fissile material for defense purposes during the Cold War. This same technology is now being used to stabilize corroded spent fuel, producing a relatively stable form of plutonium or highly enriched uranium, and a variety of wastes, including high level liquids, which are being vitrified in the Defense Waste Processing Facility; transuranic wastes, which are intended to be disposed of in WIPP, and low level waste, which will be disposed of on-site at the Savannah River Site. Although the volume of these wastes is much larger than the volume of the original spent fuel, each waste form can be stabilized with existing technology, and has an established "path forward" for addressing final disposition issues.

The Department is now examining the future roles of the reprocessing canyons at the Savannah River Site, which are the only operational reprocessing facilities in the United States. A recently completed study to determine the most suitable strategy regarding the future use of these facilities recommended a scenario that would focus our resources on the operation of the F-Canyon and place the H-Canyon in a "de-inventoried standby condition"after certain operations in the H-Canyon were completed (i e , removal of nuclear materials and maintenance of the facility in standby status). Such a strategy could result in a costs savings of approximately $200 million over the next ten years and would allow the Department to concentrate our experienced personnel at the site on the tasks of completing the startup and safe operation of the F-Canyon Facilities, the Defense Waste Processing Facility, and other important operations. The Defense Nuclear Facilities Safety Board and members of Congress have expressed concern with the study recommendation to phase out operations in the H-Canyon facilities. The Department is continuing to work with the Board and interested members of Congress to achieve a canyon strategy that addresses their concerns while meeting the Department's objectives of safety and cost-effectiveness. The Department will maintain the H-Canyon in a high degree of readiness in the interim. The Department will continue to emphasize safety of operations and potential need for future missions in this decision.

The Department is currently evaluating new information concerning the capability of the canyon facilities to withstand a severe earthquake. While detailed analyses are not expected to be available until July, preliminary estimates indicate that the results of these analyses are expected to confirm that the buildings will not collapse during a severe earthquake.

Also, the Department has begun developing alternative technologies for storage and/or treatment of spent aluminum clad fuel to a form suitable for future geological disposal that would not require reprocessing ro separation of the fissile material The Department is making a substantial and sustained investment in this program.

TABLE 4
NUCLEAR MATERIAL and FACILITY STABILIZATION
Funding Summary
(Dollars in Thousands)

Defense Activities	**FY 1996**	**FY 1997**	**Percent Change**
Program Integration	$27,561	$2,336	-91.5%
Surveillance and Maintenance	552,707	463,120	-16.2%
Stabilization/Deactivation Actions	123,138	163,203	+32.5%
Program Support	8,443	2,394	-71.6%
Change in Inventories	0	-100	N/A
Spent Nuclear Fuel	148,001	187,711	+26.8%
Construction	55,894	85,157	+57.7%
Subtotal, Defense	915,744	903,821	1.3%
Non-Defense Activities			
Program Integration	2,846	2,107	-25.9%
Surveillance and Maintenance	43,144	42,673	-1.3%
Stabilization/Deactivation Actions	27,398	38,542	+40.7%
Spent Nuclear Fuel	1,135	1,460	+28.6%
Construction	4,048	6,571	+62.3%
Subtotal, Non-Defense	78,571	91,353	+16.3%
TOTAL, NUCLEAR MATERIAL AND FACILITY STABILIZATION	**$994,315**	**$995,174**	**+0.1%**

Science and Technology
Budget Request: $355,907,000
(6 percent of the total Environmental Management budget)

Some of the environmental, health, and safety risks present at our sites cannot be reduced, either because the technology does not exist to address these risks, or because today's solutions would cost too much. By recognizing the potential for new technologies to provide better and cheaper solutions, we can identify projects that can be stabilized for the near-term, while we allow science and engineering research to find better long-term answers. The Office of Science and Technology reflects our strategy of investing in technology development to develop long-term effective methods for addressing environmental challenges. The goals of our technology development program include reducing risks to people and the environment, reducing cleanup costs, and finding new technologies for environmental problems for which no solutions currently exist. The Office of Science and Technology program is an aggressive national program of basic and applied research, development, demonstration, testing, and evaluation for environmental cleanup, waste management, and related missions. Our strategy is to identify and develop technologies that can clean up the nuclear weapons complex, and manage the wastes more quickly, more safely and at a lower cost. In many cases, developing new technologies presents the best hope for ensuring a real reduction in risk to the environment and improved worker and public safety, especially given our national fiscal constraints. We have already achieved significant savings through the use of these improved technologies.

Responding to a Congressional mandate from the Fiscal Year 1996 Energy and Water Appropriations Act, the Department has initiated a $50 million partnership between the Office of Science and Technology in the Environmental Management program and Department's Office of Energy Research to advance the weapons cleanup program. The Administration will propose about $38 million in the Fiscal Year 1997 budget to advance the effort of the Environmental Management's Science program. The new program will carry out a long-term research agenda focusing on the fundamental science needed to develop less costly, innovative cleanup methods and reduce risks to cleanup workers and communities near weapon cleanup sites.

The Office of Environmental Management's risk activities are also conducted from the Office of Science and Technology. These activities support decision making by developing policy, requirements, and guidance for implementing credible and dependable risk assessment, management and communication processes.

TABLE 5
TECHNOLOGY DEVELOPMENT
Funding Summary
(Dollars in Thousands)

Defense Activities	FY 1996	FY 1997	Percent Change
Treatment and Remediation Technology Systems	$154,106	$166,873	+8.3%
Crosscutting Programs	42,208	44,183	+4.7%
Industry and University Programs	61,337	62,154	+1.3%
Technology Integration	20,595	21,747	+5.6%
Program Management	19,635	8,814	-5.5%
TOTAL, TECHNOLOGY DEVELOPMENT	**$297,881**	**$303,771**	**+2.0%**

ENVIRONMENTAL MANAGEMENT SCIENCE PROGRAM
Funding Summary
(Dollars in Thousands)

Defense Activities	FY 1996	FY 1997	Percent Change
Basic Science Program	$50,000	$38,137	-23.7%
Risk Policy Program	13,875	13,999	+0.1%
TOTAL, EM SCIENCE PROGRAM	**$63,875**	**$52,136**	**-18.4%**

CONCLUSION

We are making real progress in the Environmental Management program in addressing some very real health and safety risks and in improving the way we do business. These results are clearly shown by the fact that for two straight years we have reduced our budget undertaking the same, or greater, workload. Nonetheless, given the long-term nature of the program, it is critical to have a vision for the future, beyond a one or two-year budget cycle.

One of the basic problems with the Environmental Management program when it was created was that it was a stepchild of an organization that had very different priorities and missions. Today, the work of the Department with respect to nuclear weapons is much reduced and refocused. The Environmental Management program's mission has grown dramatically as we have learned the extent of the challenges we face, and as public awareness and concern about safety and health has heightened.

The environmental, safety and health problems in the nuclear weapons complex are often larger and typically more intractable than those of most conventional commercial cleanup programs. In many cases, no effective technologies exist to clean up hazardous and nuclear waste sites. Even where technology exists, we often lack clear standards on "how clean is clean?" And the fiscal reality is that there will be less money for activities we have performed in the past. It is critical to recognize that although we can economize and increase efficiency, there is a point beyond which further reductions in our budget mean less work, and increase the risks to public health, workers, and the environment.

Despite these challenges, we are moving forward. The program inherited business practices, managerial structures, and contractual systems not designed for effective completion of the type of work to be done. We have changed this and are creating a strategy to meet our goals. Assistant Secretary Grumbly's vision for the program is one that will blend business practices that are proper for the type of work that we do with the accountability and responsibility that are required of us as public servants. Our long-term strategy involves focusing on stabilizing the problems at our sites using risk based priorities, while simultaneously making the necessary investments in developing new technologies to grapple with certain intractable problems in a more cost-effective manner. We have substantially increased our investment in science and technology with the new Science Initiative and the new Spent Fuel Technology Development Program, which is centered at the Savannah River site and Idaho. Having made these investments, we are confident that the work we do in stabilizing the sites will buy us the time to implement these new more cost-effective remedial technologies in the future. We are confident that the same ingenuity that fought the Cold War will enable us to successfully seek solutions to the current challenges we face. We ask you for your full support for our budget request to continue our progress in this vital program.

APPENDIX: OFFICE OF ENVIRONMENTAL MANAGEMENT COMMITMENTS FOR THE FUTURE

With new contracts, leaner site infrastructures and effective technologies in place, we are poised to make substantial progress in Fiscal Year 1997. And we in the Environmental Management program are willing to be measured against our commitments across the country. In meeting these goals, we will comply with NEPA and all other applicable statutory and regulatory requirements.

WASHINGTON (Hanford Site)

- Eliminate imminent safety risks and substantially reduce maintenance costs for a significant set of high level radioactive waste tanks. As a result, routine mandatory requirements for protective clothing and equipment will not be required for entry. Key parameters like temperature and pressure will be monitored remotely.

- Resolve high heat safety issue after retrieval of waste from high level radioactive waste tank number C-106.

- Complete scientific investigation into the potentially serious problem of accumulations of gases resulting from the chemical reaction of ferrocyanide in the tanks, which has occurred in an uncontrolled manner after the addition of chemicals to the tanks, prior to the imposition of modern technical and safety controls.

- Start interim stabilization of seven flammable gas watch list tanks. This will remove the pumpable liquids from the organic watch list tanks to reduce leakage of highly radioactive waste in case these tanks begin to leak.

- Complete construction of and begin operation of Project W-030, the Tank Farm Ventilation Upgrades. This project will ventilate tanks that have a higher potential for accumulation of flammable gases.

- Complete removal of floating organic layer in Tank C-103. This project will remove the flammability potential and the potential for noxious vapors from the organic layer.

- Complete construction of "cross-site" transfer line. This will allow transfers of waste between high level waste storage areas and allow for the removal of waste from tanks that are found to be leaking or have other safety problems in the single shelled tanks, to the safer and much newer double shelled tanks.

- Startup of the Waste Receiving and Packaging Facility (WRAP-1) which will package low level waste for ultimate disposal.

- Complete construction of the Phase V portion of the Central Waste Complex which will be a 168,000 square foot storage facility for transuranic waste and mixed low level waste.

- Excavate and remove over 50,000 loose cubic yards of contaminated soil in at the 100-

BC and 100-HR reactor areas at Hanford, Washington.

- Complete deactivation of the final 14 N-Reactor facilities, including spent fuel basin cleanup, for eventual decommissioning and decontamination of the reactor at Hanford, Washington.
- Complete all of the deactivation activities at PUREX.
- Continue stabilization of Plutonium Finishing Plant materials according to the Defense Nuclear Safety Board Recommendation 94-1 implementation plan. Initiate stabilization of plutonium solutions using the vertical calciner, a solution stabilization process. Continue stabilization of reactive solids using muffle furnaces.
- Replace 71,000 square feet of unsafe roofing on 15 buildings at our Hanford Site
- Complete a large-scale demonstration for safe storage or "cocooning" of the Hanford C-production reactor.
- Deploy an in-situ (in place) organic contaminant detection sensor and moisture content sensor on the tip of the Cone Penetrometer, which will be pushed into Hanford tank wastes.
- Use of a subsurface imaging system (Electrical Resistance Tomography) to detect leakage from tank wastes.

SOUTH CAROLINA (Savannah River Site)

- Produce 80 to 150 canisters of high-level waste from Defense Waste Processing Facility.
- Retire one high-level waste tank from service.
- Install a final cap at the 20-acre low-level radioactive waste disposal facility to eliminate pollutant migration, and an interim cover over a 76-acre radioactive waste burial ground to significantly reduce contaminant mobility, at the Savannah River site in South Carolina.
- Complete construction, installation, and start-up of the F&H Canyon ground water remediation systems, which will remove hazardous contaminants and control tritium migration, and operate three air strippers and five soil vapor extraction units, which will remove 10,000 pounds of volatile organic compounds per month from soils and ground water, at the Savannah River site.
- Deploy advanced retrieval technologies, such as the use of water jets, for the removal of the saltcake portion of liquid high-level waste from Tank 41. New approaches and technologies for tank waste treatment will cut costs since the amount of support infrastructure and associated equipment is reduced. Currently, approximately $18

million is spent on the infrastructure equipment used for conventional tank waste preparation prior to transfer.

- Complete the optimization of magnetic separation technology (MAG*SEP) for treatment of waste waters from site cleanup at the Savannah River Site; develop new in situ applications for this technology.

- Develop electrochemical, crystallization, and salt splitting processes to reduce low level waste volume disposal.

- Begin stabilization of 3,500 gallons of plutonium-242 solution stored in H-Canyon. This material poses a risk to workers, and was identified as a high-priority by Defense Nuclear Facility Safety Board Recommendation 94-1.

- Begin stabilization of the Mark-16 and Mark-22 spent nuclear fuel, containing 7.3 metric tons of heavy metal.

- Complete stabilization (conversion to metal) of the Mark-31 plutonium targets, containing 139 metric tons of heavy metal.

COLORADO (Rocky Flats)

- Complete off-site conversion of highly enriched Uranium solutions to a solid form for storage.

- Repackage an additional 100 (for a total of 205) of the 700 inorganic drums to be repackaged by 2002. Close out remaining 11 of 21 mixed residue closure units.

- Stabilize 80 percent of the high-level solution and 50 percent of the low-level solution at the site.

- Complete design review and installation of equipment to begin stabilization of approximately 16,000 kilograms of Plutonium-bearing salt resides for completion in December, 1997. Complete design review and equipment installation to begin the stabilization of approximately 4,000 kilograms of sand, slag and crucible.

OHIO (Fernald, Mound, Portsmouth)

- Complete the essential design activities and D&D of two highly-contaminated buildings, thereby maintaining the accelerated cleanup schedule while reducing risks to workers at the Fernald site in Ohio.

- Complete the construction and start up of a waste water treatment plant and the construction of the on-site disposal facility at Fernald to reduce further long-term risks to human health and the environment.

- Complete disposition of approximately 32,400 cubic feet of low-level waste and the remaining nuclear materials waste inventory, significantly reducing landlord costs and enabling building demolition to proceed on schedule, at the Fernald site

- Use innovative technologies and new processes that maximize efficiency and recycle potential, we will complete a large-scale decontamination demonstration at the Fernald Plant 1 uranium processing facility

- Fully field test technologies at the Portsmouth Gaseous Diffusion Plant for in situ (in place) remediation of groundwater contaminated with radionuclides and organic compounds and with dense non-aqueous phase liquids (DNAPLs)in clay-like, low permeability material.

IDAHO (Idaho National Engineering Laboratory, Argonne National Laboratory - West)

- Operate the Sodium Processing Facility (SPF) to treat 70,000 gallons bulk sodium at Argonne National Laboratory-West

- Restart the New Waste Calcining Facility, which uses thermal treatment to convert waste from liquid to a granular form, and process 140,000 gallons of liquid high-level waste into more stable form for safe storage.

- Continue incineration of low-level waste (LLW) and mixed LLW in the Waste Experimental Reduction Facility (WERF) to treat 6,500 cubic feet of inventory

- Begin the private sector treatment of transuranic and mixed radioactive and hazardous chemical waste. The Request for Proposal has already been issued and project work is expected to begin in June 1996

- Complete retrieval and treatment facilities construction and limited production test of operational systems, and initiate the retrieval and treatment of pit contents, at the Idaho National Engineering Laboratory (INEL), Pit 9.

- Install landfill caps at the Central Facilities Area burial grounds and the former SL-1 reactor/BORAX I reactor burial grounds, and complete the Decontamination and Decommissioning of the Advanced Reactor Area II, at INEL.

- Complete deactivation of Advanced Reactor Measurement Facility, e.g., capping of floor lines, turning off utilities, etc.

- Complete transfer of all 627 spent nuclear fuel elements from the North and Middle Basins of CPP-603 to safer storage areas, and continue fuel repackaging and transfer from the South Basin of CPP-603.

- Demonstrate the dismantlement of the CP-5 Reactor at Argonne National Laboratory - West using hardened robotic remote systems that withstand radioactive degradation.

Using hardened remote systems protects workers, is more cost effective, and prolongs the life of the equipment since it is protected against the damaging effects of radiation and other environmental hazards.

- Complete a large-scale decontamination and dismantlement demonstration at the Chicago Pile-5 Test Reactor at Argonne-East.

- Develop processes to extract strontium, cesium, technetium, lanthanum and transuranics in a single process at Argonne National Laboratory.

- Deploy the Light Duty Utility Arm in Idaho liquid high level waste tanks to inspect tank surfaces and demonstrate its full-scale retrieval capability.

- Demonstrate a mobile van waste inspection systems that will perform nondestructive evaluation and assay (analysis) of containerized nuclear wastes at Idaho National Engineering Laboratory. (The combined nuclear techniques will assay wastes to meet performance requirements of the Waste Isolation Pilot Plant acceptance criteria.)

- Complete radioactive bench-scale testing of the Plasma Hearth System, and transfer the technology to mixed waste treatment privatization initiatives.

- Complete demonstration of viscous liquids containment and prepare performance standards based on the results. Test innovative verification and monitoring tools.

- Complete implementation of the Telerobotic Retrieval System at Pit 9.

- Complete in situ (in place) stabilization of buried waste using grouting techniques and prepare performance standards.

CALIFORNIA (Lawrence Livermore National Laboratory)

- Continue construction of consolidated waste treatment and storage facility at Lawrence Livermore National Laboratory.

NEW MEXICO (Sandia National Laboratory, Los Alamos National Laboratory, Waste Isolation Pilot Plant)

- Continue remediation of transuranic waste at Los Alamos National Laboratory while we work toward a new completion date for a renegotiated Consent Order with New Mexico. Remediation includes retrieving waste from earthen covered storage units that do not meet certain Resource Conservation and Recovery Act (RCRA) requirements and placing the repackaged waste on storage pads under metal framed domes that meet RCRA requirements.

- Submit to the Environmental Protection Agency (EPA) an application to certify the

Waste Isolation Pilot Plants (WIPP) compliance with EPA's disposal regulations for transuranic waste.

- Obtain a final decision from the EPA on the DOE No-Migration petition for WIPP.
- Complete ten expedited cleanups at Los Alamos National Laboratory in New Mexico.
- Test innovative designs and alternative materials for barrier protection to determine cost and performance parameters and to verify integrity techniques.
- Test various ion exchange materials, at Sandia National Laboratory, on both simulated and actual radioactive material, to determine best method to remove cesium, strontium, and technicium from high level waste streams.

TENNESSEE (Oak Ridge Reservation)

- Continue safe operation and maintenance of treatment, storage, and disposal facilities for sanitary, hazardous, radioactive, and mixed waste.
- Treat 1.6 million pounds of liquid waste at a minimum, and 500,000 pounds of solid waste at the Toxic Substances Control Act (TSCA) incinerator.
- Complete the decommissioning of six cooling towers at the K-25 site in Tennessee, thereby removing uranium contaminated sediments and eliminating fire and industrial hazards associated with the facilities.
- Initiate an interim action to cap a uranium burial ground to mitigate the leaching of uranium into ground water, and complete construction of a treatment facility to support an interim action for containing radioactively contaminated groundwater that is migrating off-site at the Paducah, Kentucky site.
- Remove the spent nuclear fuel currently stored in the Bulk Shielding and Tower Shielding Reactors at Oak Ridge to the Savannah River Site.

MISSOURI (Kansas City Plant)

- Replace faulty, leaking overhead industrial waste piping system in the Industrial Wastewater pre-treatment plant at the Kansas City Plant.

NEVADA (Nevada Test Site)

- Continue disposal operations for packaged low-level wastes from other DOE sites.

FLORIDA (Pinellas Plant)

- Close and complete the transfer of the Pinellas Plant to the Pinellas County Industrial Council. Continue residual pump and treat, and administrative requirements.

TEXAS (Pantex Plant)

- Continue environmental operations in support of weapons dismantlement and stockpile stewardship.

Department of Energy
Washington, DC 20585

REAR ADMIRAL RICHARD J. GUIMOND

Rear Admiral (RADM) Richard J. Guimond is the Principal Deputy Assistant Secretary for Environmental Management at the U.S. Department of Energy. He has been in that position since November 1993. He supports the Assistant Secretary for Environmental Management in the overall management, technology development and facility transition and management programs which employ over 3,000 Federal employees nationwide. The Office's budget is approximately $6 billion.

A Commissioned Officer in the United States Public Health Service since 1970, RADM Guimond was appointed Assistant Surgeon General in 1989.

Prior to assuming his duties at the Department of Energy, RADM Guimond served on an extended detail to the Environmental Protection Agency (EPA) for most of his career. He joined EPA at its inception and served in a number of different capacities, the most notable being the Acting Assistant Administrator and the Deputy Assistant Administrator for Solid Waste and Emergency Response. He ran the Superfund Program and hazardous waste control activities.

At EPA, RADM Guimond also served as the Director of the Office of Radiation Programs and the Director of the Radon Division and is particularly well known for his efforts and leadership in the development and implementation of the nation's indoor radon protection programs. RADM Guimond was also involved with EPA programs concerning control of PCB's, Asbestos, CFC's, radioactive wastes and emissions.

He is the recipient of numerous awards and honors, including the Public Health Service's Distinguished Service Medal, Meritorious Service Medal and the Surgeon General's Medal for Exemplary Service. He also received EPA's Distinguished Career Award. In 1992, he was awarded the Executive Excellence Award from the Senior Executive Association. He was the first recipient of the award from the Environmental Protection Agency.

RADM Guimond is a 1969 graduate of the University of Notre Dame. He earned his Master of Engineering degree from Rensselaer Polytechnic Institute in 1970, and a Master of Science degree in Environmental Health from Harvard University in 1973.

RADM Guimond resides in Fort Washington, Maryland, and has one teenage daughter, Nikki.

February 1996

Statement of
Daniel A. Dreyfus, Director
Office of Civilian Radioactive Waste Management
Department of Energy
FY 1997 Appropriations Hearing
March 26, 1996

I am Daniel A. Dreyfus, Director of the Department of Energy's Office of Civilian Radioactive Waste Management. I appreciate the opportunity to appear before you today to discuss our Fiscal Year (FY) 1997 budget request and the revised strategy for the Civilian Radioactive Waste Management Program, which is being developed in response to FY 1996 Energy and Water Development Appropriations actions.

BACKGROUND

The Nuclear Waste Policy Act, as Amended. The Nuclear Waste Policy Act of 1982 created the Office of Civilian Radioactive Waste Management within the Department of Energy to develop a system to accept, transport, store, and permanently dispose of spent nuclear fuel from commercial utilities. To pay for the system, the Act established a Nuclear Waste Fund financed by fees from the ratepayers of nuclear utilities. A presidential decision in 1985 directed that the system also provide for the disposal of radioactive wastes resulting from atomic energy defense activities. A General Fund appropriation is made to offset the costs associated with the disposal of defense-related waste. The Nuclear Waste Policy Amendments Act of 1987 designated the Yucca Mountain site in Nevada for detailed scientific investigation to evaluate the site's suitability for a geologic repository.

Program Approach. In 1994, we proposed a Program Approach and funding profile that would permit us to meet the policy goals set by Congress in the Nuclear Waste Policy Act. That approach was pursued with the FY 1995 appropriation of $522 million for the program, which represented an increase of $142 million over the FY 1994 funding level of $380 million. The Civilian Radioactive Waste Management Program followed the Program Approach into the Fall of 1995, when we received new policy redirection from Congress in our FY 1996 appropriation.

PAST YEAR'S PROGRESS

I am pleased to report that we have made significant progress since my last appearance before this committee. Almost all of the increase in funding for FY 1995 was allocated to, and utilized by the Yucca Mountain Project, which completed the fiscal year with accomplishments that often exceeded our targets.

Yucca Mountain. We have completed more than one-half of the planned five mile exploratory studies facility tunnel at Yucca Mountain and are now tunneling through the proposed repository horizon. Four test alcoves have been excavated to install instrumentation and to provide scientists with access to major geologic features. Thus far, we have found no unexpected geologic conditions that would contradict our hypotheses about the Yucca Mountain site. We have substantially reduced the scientific and technical uncertainty concerning the suitability of the proposed repository site through the analysis of scientific data collected to date.

Since last year, we also completed a performance assessment of the whole repository system, which indicated that the man-made engineered features of the repository, in conjunction with the natural elements of the site, could provide containment of spent nuclear fuel and high-level radioactive waste for tens of thousands or even hundreds of thousands of years.

Waste Acceptance, Storage, and Transportation. Over the past year we made progress on cask development and environmental requirements for the transport of waste, assuming waste acceptance in 1998. In preparation to move large quantities of waste, we have initiated non-site-specific contingency planning which will increase our capability to respond to new policy direction on interim storage. We have developed concepts for a national waste acceptance and transportation strategy that relies on the private sector for implementation; and a generic safety analysis for an interim storage facility that could expedite facility licensing and development time if a site is authorized.

Program Management. Since last March, major improvements have been made in the integration and efficiency of program management. We have continued to improve integration of activities, clarify lines of authority and responsibility, and increase our coordination with the Nuclear Regulatory Commission. The participants in the program have now been fully consolidated under the program's Management and Operating contractor. We are concentrating current attention on the improvement of management information tools (e.g., schedule, baseline, and reporting processes). As a consequence of our planning and management improvements, we have been able to develop a program that can preserve the objectives of the Yucca Mountain project at substantially reduced funding levels.

I am pleased that the independent Nuclear Waste Technical Review Board acknowledged our progress in their February 23, 1996 letter to Secretary O'Leary. The Board, which is kept informed on the progress of the program in detail agreed that:

> "Significant progress has been made in a number of areas at Yucca Mountain during this past year. The DOE has greatly increased the efficiency of the underground tunneling operation at the site; the main tunnel is now more than 2.5 miles long and is exploring at the proposed repository level. The DOE is obtaining data about the character and hydrology of the underground rock where waste eventually could be placed. In addition, a clear and technically defensible waste isolation strategy is beginning to emerge. This strategy will help explain how the natural and engineered barriers at the site should work together to isolate radioactive waste from the environment. Together with recent advances in repository performance assessment, the strategy will enable the DOE to set

> priorities among exploration and testing activities to achieve a better understanding of the hydrology and other characteristics of the site -- in less time and at less cost. Finally, current management is continuing to improve program focus and effectiveness."

PROGRAM REDIRECTION AND TRANSITION

The Energy and Water Development Appropriations Act for FY 1996 provided a total of $400 million in discretionary funds for the program, of which $85 million may be expended only for an interim storage facility upon enactment of specific statutory authority. Lacking such authority, the program was reduced to a $315 million funding level for FY 1996, which represents a forty percent reduction in the level of effort from FY 1995.

Congress recognized that a more constrained repository program would be required. The Conference Report accompanying the appropriations language provided specific guidance to refocus the Yucca Mountain Project to emphasize core scientific activity, excavation of sections of the exploratory studies facility necessary for scientific study, and completion of the repository and waste package conceptual design. The guidance also provided for the deferral of activities supporting preparation and filing of a license application for the repository.

Revised Program Strategy. Consistent with the guidance provided by Congress, we have defined a revised program strategy compatible with our new funding profile. With reasonable future funding support, however, we believe that our revised strategy will enable the program to regain the longer range objectives of the Nuclear Waste Policy Act regarding the evaluation of geologic disposal as a means to permanently isolate commercial spent nuclear fuel and defense high-level radioactive waste from the environment. In the immediate near-term, we have focused available resources on addressing the most critical technical issues remaining in the repository program and on the necessary transitional costs of the program reduction.

Yucca Mountain. As Congress requested, we have refocused our efforts at Yucca Mountain to address the critical unanswered technical questions leading to an assessment in 1998 of the viability of licensing the proposed repository site. These unanswered questions involve the movement of water through the mountain, the presence of any geologic features that could adversely impact repository performance, constraints on the repository's thermal load, selection of materials for the waste packages, and the need for and feasibility of other engineered barriers to enhance overall repository performance.

We have defined a set of products, consistent with FY 1996 Congressional guidance, that will provide a better understanding of the repository design and its performance in the geologic setting, a better appreciation of the remaining work needed to prepare a license application, and a more accurate estimate of the cost of a repository. We believe that these products taken together will, by 1998, provide sufficient financial and technical data to allow the Congress to decide whether to continue the program to repository licensing and construction. Although Congress also advised that repository licensing activities should be deferred in FY 1996, the long-range goal of submitting a successful license application to the Nuclear Regulatory Commission remains central to the program's mission under the Nuclear Waste Policy Act. The 1998 assessment will be an early and integral step on the path to preparing a repository environmental impact statement and a license application. Completion of the assessment by 1998 will be possible because we can draw upon scientific studies done at the site since the 1970s, the large amount of information collected over the past three years on site conditions, the progress already made on the advanced conceptual designs for the repository and waste package, and the understanding gained from the latest in our series of iterative total system performance assessments.

Another key element of our revised program strategy will be to review and update the regulatory framework for licensing a repository. The existing framework that guides our investigation of the Yucca Mountain site does not fully reflect policy changes since the Nuclear Waste Policy Act was enacted in 1982, the experience of the past decade of work, and the realities of budgetary constraints on the program. Our objective is to focus on the safety considerations of the site itself, while eliminating activities that are now known to be unnecessary to establish the safety of the repository concept we will propose. As I will explain later, we believe that we can regain a target date of 2002 for submitting a license application to the Nuclear Regulatory Commission for authorization to construct the repository. That date will depend, of course, upon confirmation of the viability of the Yucca Mountain site, a restructured approach to the remaining regulatory-related work, and continued financial support.

Waste Acceptance, Storage, and Transportation. In response to Congressional direction, we are closing out most of our waste acceptance, canister and cask development, and transportation work. We will not pursue the further development of a multi-purpose canister system for transporting and disposing of spent fuel. We believe that the multi-purpose canister approach is sound, and private industry may elect to carry the design of one or more multi-purpose canister systems forward. The development and certification of advanced technology, legal-weight truck casks for transportation of uncanistered spent fuel from reactors to a storage or disposal facility will be phased out in an orderly manner to permit commercialization by private industry, if warranted at a later date. We plan to rely upon commercially available technologies when the transportation of spent fuel begins. In addition, we transferred the lead responsibility for the multi-purpose canister environmental impact statement to the Department of the Navy, which has a continuing requirement to document their decisions.

We have restructured our waste acceptance, storage, and transportation activities to maintain a capability to respond quickly and effectively if new interim storage policy is forthcoming. These efforts will target two major near-term objectives. First, we will work to engage industry in the development of a market-driven waste acceptance and transportation strategy that relies heavily on the private sector for implementation. Second, we will conduct non-site-specific work on a generic interim storage facility to make early progress toward an NRC license.

Program Management. As a result of the reduced FY 1996 funding level, we have had to greatly reduce the contractor work scope and support in program management functions, which include the activities of the Office of Human Resources and Administration, the Office of Quality Assurance, and the Office of Program Management and Integration. We have eliminated approximately 1000 contractor positions at the Yucca Mountain Project and at our Washington, D.C. headquarters. We also reduced the funding we provide to maintain our cooperative agreements with program stakeholders to one-third of their FY 1995 budgets. As we took these actions, we sought, within our existing authorities, to preserve essential program activities.

We have restructured our program management activities to further enhance our management effectiveness. Our primary objective is to retain the vital objectives of the program. We will concentrate on addressing significant cross-cutting technical issues; on improving the linkages across the program through increased integration; on increasing the utilization of Federal staff with a decreasing reliance on contractor support; and on major improvements in the program's management tools such as schedules, baseline and change control, performance monitoring and review, and reporting processes that will increase our ability to concentrate reduced resources on meaningful accomplishments.

FY 1997 BUDGET REQUEST OVERVIEW

The President's budget request for FY 1997 is consistent with the redirection resulting from the FY 1996 budget reduction. It will support the licensing approach that we have developed for the repository program.

In order to support the scientific work on the permanent repository, the President's FY 1997 budget proposes to fund the program at a level of $400.028 million. The civilian portion of the radioactive waste management program is $200.028 million, to be derived from the Nuclear Waste Fund. The Defense share of $200 million is from the Defense Nuclear Waste Disposal Appropriation. It will cover the cost associated with the disposal of defense high-level radioactive waste in the repository. The full amount is intended to be discretionary appropriations. No other legislative action is required to support the appropriation.

Of the $400 million request, $339 million will go to the Yucca Mountain Site Characterization Project. Of the remaining funds, $10 million will go to the Waste Acceptance, Storage, and Transportation Project, and $51 million will be required for Program Management activities.

Yucca Mountain. The $339 million we are requesting for FY 1997 will be used to address the remaining scientific and technical uncertainties concerning the construction and operation of a repository at Yucca Mountain; and to regain a viable target to file a license application for a repository in the year 2002.

We will apply the FY 1997 funding toward work on the four primary components of the repository viability assessment.

First, we will complete a package of specific design work on the critical elements of the repository and the waste package, including a concept of operations that identifies available technologies to accomplish the objectives of geologic disposal.

Second, we will prepare a total system performance assessment, based upon this design concept and available scientific and technical data, which will integrate and analyze design and site characteristics and describe the probable behavior of the repository.

Third, we will develop a plan and cost estimate for the remaining work required to complete a license application.

And finally, we will estimate the cost to construct and operate the repository.

Key repository activities to be undertaken during the fiscal year to support the assessment include the completion of the exploratory studies facility and the continuation of our core science work. In FY 1997, we will gain access to and begin to test the properties of the Ghost Dance Fault, and initiate the drift-scale thermal test to investigate the coupling of thermal hydrologic, mechanical, and chemical processes in the rock. This will be our first large-scale test that will explore how the rock will behave in the presence of waste packages.

In FY 1997, we plan to reinitiate our National Environmental Policy Act (NEPA) activities to support the preparation of the draft and final repository environmental impact statements in FY 1999 and FY 2000, respectively. Through a public rulemaking process, we will begin to modify the Department of Energy's repository siting guidelines in support of the approach we are now proposing.

Waste Acceptance, Storage, and Transportation. The FY 1997 request for our waste acceptance, storage and transportation activities is $10 million. It will be used to continue the administrative and coordination activities that we are responsible for under the Nuclear Waste Policy Act and to support some progress on non-site-specific initiatives that will address the long lead time activities that must precede removal of spent nuclear fuel from reactor sites once a federal facility becomes available.

Program Management. The FY 1997 request for program management is $51 million. This figure includes $2 million to maintain our quality assurance program, $10 million for human resources and administration, $9 million for technical and regulatory integration and planning activities, and $30 million for program direction (including Federal salaries). Following Congressional guidance for FY 1996, program management efforts have been reprioritized to provide support for the completion of core scientific activities and conceptual designs for a repository at Yucca Mountain, and for the development and implementation of strategies to improve the program's capability to respond to Congressional direction regarding interim storage.

The remainder of my statement reviews in more detail the progress we have made since your hearing last year, the work we will accomplish during the remainder of FY 1996, and the work we propose to do with the funds we are requesting for FY 1997.

1995-1996 ACCOMPLISHMENTS

Yucca Mountain. Since I testified before this Committee last March, we have made substantial progress toward the characterization of the Yucca Mountain site.

Waste Isolation Strategy. We substantially refined our strategy for the containment and isolation of radioactive wastes. The strategy relies on engineered barriers, geologic features, and natural processes to delay releases of radionuclides to the environment outside of the Yucca Mountain site and to minimize any exposure to the public. The strategy is based on the theory that dissolution and transport of radionuclides would be restricted because of the limited amount of water moving through the rocks in and around the repository. In this strategy, a Yucca Mountain repository would completely contain wastes within the engineered barriers for thousands of years and minimize doses to the population living near the site for tens of thousands to hundreds of thousands of years.

Exploratory Studies Facility. By increasing the efficiency of tunnel boring machine operations throughout the year, we made important progress constructing the exploratory studies facility. We have completed over one-half (almost three miles) of the planned excavation at Yucca Mountain and are now tunneling through the proposed repository horizon, significantly ahead of schedule. We have passed the location of the first planned Ghost Dance Fault alcove. We are making every effort within limits of available funds to continue the progress on the tunnel and the scientific work associated with it. Four test alcoves have been excavated to provide scientists with direct access to the repository setting where they can observe and test major geologic and hydrologic features of the Yucca Mountain site, and study the geomechanical properties of its rock and its response to construction activities in the proposed repository setting. We have completed construction of the North Portal and have begun excavation of the thermal test alcove.

Core Science. We have appreciably reduced the scientific and technical uncertainty surrounding the proposed repository site through the analysis of the scientific data we have collected. Our results continue to confirm that, consistent with our waste isolation and containment strategy, the natural system at the site would contribute significantly to waste isolation.

- The rock at the repository level is more competent than had been anticipated.
- The rock is even drier than expected, with no dripping or flowing water.
- Our investigations reveal some indications that ground water flow at the repository horizon has been very limited for 100,000 years or longer.
- We have found no unexpected geologic features, such as major new faults.

In addition, we found that the Drill Hole Wash structure, identified at the surface as a fault several tens of meters wide, is a less significant feature at repository depth than expected. These observations led to elimination of the need for one planned test alcove, and raises the possibility that a substantially larger area is available for the repository than was originally assumed.

Tunnel Boring Machine (TBM) Performance. The efficiency of the underground tunneling operation has been greatly increased. Installation of a muck conveyor system in July 1995 allowed us to replace the muck cars used to remove excavated rock during the early phase of tunnel construction. The conveyor system has reduced by 30 to 50 percent the time required to complete the excavation cycle. In addition, we implemented modifications to the TBM's steering, hydraulics, gripping capability and cutter head to improve TBM efficiencies. In combination with an aggressive management strategy that consolidates outages and minimizes TBM downtime, the rate of progress has been greatly improved. Consequently, we have reduced the cost of construction significantly.

Performance Assessment. We completed a performance assessment of the repository system as we currently envision it. The performance assessment evaluates the ability of the natural and engineered barrier systems to meet repository performance objectives. It indicated that the man-made features of the repository could provide containment for spent nuclear fuel and high-level radioactive waste.

The results also indicate that, under certain assumptions, the natural processes alone can contribute to isolation of the radionuclides for a very long time-period. The analyses tend to confirm our understanding of the importance of the rate and distribution of ground-water movement to the performance of the natural system. A combination of waste package and site performance can be shown to contribute to containing and isolating radioactive waste within the Yucca Mountain area for some tens of thousands to even hundreds of thousands of years.

Regulatory Interactions. We provided a revised License Application Annotated Outline and Topical Report II for Seismic Hazards Methodology to the Nuclear Regulatory Commission. We also closed with the Commission on the extreme erosion issue.

Environmental Requirements. We completed the repository environmental impact statement scoping process that will support our work under the National Environmental Policy Act.

Surface-Based Testing. During FY 1995, we continued to collect information from our surface-based testing activities, including data on the properties of the rock at-depth to support design and construction of the exploratory studies facility, data on the characteristics of water movement in the unsaturated and saturated zones, and data relevant to the evaluation of the waste package environment. We continued to monitor precipitation and meteorological conditions, infiltration from precipitation events, streamflow and runoff, water levels in wells, and seismicity. We analyzed groundwater samples to assess their age and the characteristics of infiltration since nuclear weapons testing began at the Nevada Test Site. We continued our program to monitor natural infiltration in unsaturated zone boreholes. We also completed engineering reports to identify the proposed repository configuration and we confirmed our understanding of the geologic structure at the north end of the repository block.

Pneumatic Gas Flow. In response to concerns expressed by Nuclear Regulatory Commission staff, the State of Nevada, and Nye County, Nevada, we implemented a program to collect information on the base-line characteristics of pneumatic gas flow in Yucca Mountain. We performed continuous pneumatic monitoring of selected boreholes before, during, and after tunneling penetration of the non-welded unit of the Paintbrush Tuff. Results indicate that the Paintbrush Tuff non-welded unit, which overlies the formation in which the repository would be constructed, acts as a partial barrier to gas flow. This pneumatic data confirms the results from hydrologic investigations, which indicate that the non-welded unit acts as a barrier to water infiltrating through the overlying units and to divert it away from the repository horizon. These results will be utilized in modeling gas flow in a thermally perturbed repository as part of our next performance assessment.

Waste Acceptance, Storage, and Transportation. In preparation to move large quantities of spent nuclear fuel, we have initiated non-site-specific contingency planning to respond to new policy direction on interim storage. Work includes the development of a waste acceptance and national transportation strategy that relies on the private sector for implementation. The strategy would utilize commercially available transportation and storage equipment that has been certified by the Nuclear Regulatory Commission. Our contingency planning also includes the development of a generic interim storage facility safety analysis to expedite facility licensing and development time if a site is authorized.

We completed the packaging of spent fuel hardware for removal from pool storage at the Idaho National Engineering Laboratory. Six of the ten Class C waste packages were shipped for disposal

Canister and Cask Development. A contract for the design and certification of a multi-purpose canister system was issued to Westinghouse Government and Environmental Services Company in April 1995 The initial phase of the three-phase contract covered system design and the preparation of three safety analysis reports, the first of which was submitted to the Nuclear Regulatory Commission in April 1996. In addition, we completed the fabrication of an advanced technology, high-capacity, legal-weight truck cask half-scale model and completed testing to verify cask design analyses. These casks are capable of transporting bare, or uncanistered, spent fuel from reactors to a storage or disposal facility. We completed transfer of the multi-purpose canister environmental impact statement preparation to the Department of the Navy.

Regulatory Interactions. We submitted a formal report on burn-up credit to the Nuclear Regulatory Commission for review. Approval of the burn-up credit methodology will lead to substantially more efficient transport and storage technologies.

Environmental Requirements. We issued a multi-purpose canister system environmental impact statement implementation plan; completed the scoping process for the multi-purpose canister system environmental impact statement; and developed a preliminary draft multi-purpose canister environmental impact statement.

Program Management. We updated various program control documents such as the Systems Engineering Management Plan, the Baseline Management Plan, and Test and Evaluation

Management Plan. We have also issued and began the implementation of our first integrated, programwide information management strategic plan as a first step toward streamlining and better integrating our information services. In September 1995, we revised the program baselines to reflect the Program Approach and published an updated Total System Life Cycle Cost analysis of the program. We updated the Program Cost and Schedule Baselines, the Civilian Radioactive Waste Management System Requirements Document, and the Program Work Breakdown Structure. We also developed a Quality Assurance Transition Plan.

Human Resources and Business Management. We completed the consolidation of our major program participants under the Management and Operating Contractor for better integration and coordination. We initiated a procurement for a consolidated technical support services contractor to improve performance at a reduced level of funding. We managed a major program revision to respond to budget reductions (eliminating over 1,000 contractor positions). We improved our management systems to provide for more effective utilization of reduced funding and staff. We also established the Office of Civilian Radioactive Waste Management Home Page on the Internet, which has dramatically improved the public's access to programmatic information.

Quality Assurance. We completed the initial consolidation of program quality assurance procedures and developed and implemented a Quality Assurance Transition Plan that consolidates quality assurance audits.

REMAINING ACTIVITIES IN FY 1996

Yucca Mountain. Through the remainder of this fiscal year, we will continue tunneling the exploratory studies facility and will also initiate the excavation of two additional test alcoves to complement the four already completed. One new alcove will be used for conducting heater tests to study the response of the ground water and rocks to heat that will be generated by the spent nuclear fuel and high-level radioactive waste. The other new alcove will provide access near the Ghost Dance Fault to study its hydrologic characteristics and to determine if it acts as a preferential path of water flow through the repository. If funding permits, we will complete the main tunnel excavation at the repository level.

Core Science. Attention will continue to be focused on the analysis and documentation of the substantial amount of data collected to date. Key models of natural processes, including those for flow and transport in the saturated and unsaturated zones, will be documented and available by the end of FY 1996. This documentation will provide input for the design work and for the next iteration of total system performance assessment that will support the repository viability assessment. Testing in the exploratory studies facility will focus on the hydrologic characteristics of faults and contacts between different rock units above the repository level We will penetrate and begin testing the Ghost Dance fault at the repository horizon to understand its role in movement of groundwater through the repository. We will prepare for the single element thermal mechanical (heater) test to collect the data needed to determine the stability of underground openings when subjected to the heat from waste packages. This test should start later this calendar year. In addition, we will issue the repository waste isolation and containment strategy.

Only a few surface-based tests were planned for FY 1996. Those tests focus on the hypotheses in our waste containment and isolation strategy. Testing at the C-Well complex will continue to generate data to characterize groundwater flow and radionuclide transport in the saturated zone. Monitoring related to characterization of seismicity, meteorological conditions, pneumatic pathways, and saturated and unsaturated zone hydrology will be continued. Geologic mapping will continue as the TBM advances towards completion of the tunnel.

Repository Advanced Conceptual Design. We will issue advanced conceptual design reports for the repository and waste package. The reports will describe the design process, depict the major repository configurations, components, and operational concepts, and identify those areas of design requiring further refinement. The reports will be prepared in sufficient detail to develop confidence in the overall design of a repository that could be operated at Yucca Mountain, and to serve as the basis for the viability assessment designs.

Performance Assessment. We will complete additional sensitivity analyses of the current performance assessment to improve our evaluation of the significance to total system performance of various components of the natural and engineered barriers. These analyses, together with the waste containment and isolation strategy, will be used to narrow the scope of our site characterization and design work by identifying the additional important site and design-related information required for performance assessments for the viability assessment and potential licensing.

If funding is available, we will also initiate a phased peer review of the performance assessment that will run through 1999. The comments and recommendations available from each step of the peer review will be incorporated as appropriate as the total system performance assessment is developed for the viability assessment.

Regulatory Process. We will propose revisions to the Department's Siting Guidelines (10 CFR Part 960) to focus on the most important aspects of evaluating a single repository site. Through a public rulemaking, we will clarify and simplify the procedural aspects of the site characterization process. Our proposal will address the most important aspects of evaluating a single repository site consistent with the Congressional guidance provided by the 1987 amendments to the Nuclear Waste Policy Act, and with guidance provided during the FY 1996 appropriations process. The proposal will also focus on protecting worker and public health and safety and the environment.

Waste Acceptance, Storage, and Transportation. We will continue to collect utility data in preparation for the acceptance of waste. We will commence work on and publish a Notice of Expression of Interest to begin public discussion of the market-driven initiative to create a national spent nuclear fuel transportation capability. The development and certification of advanced technology, legal-weight truck casks will be phased out. We plan to rely upon commercially available technologies when the transportation of spent fuel begins. We will complete the first phase of Westinghouse multi-purpose canister contract for system design and preparation of safety analysis reports, and then close out the contract.

Environmental Requirements. Since work on the development of the multi-purpose canister system will not continue past the design phase, our work on the environmental impact statement for the fabrication and deployment of multi-purpose canisters also has been terminated. Argonne National Laboratory, our support contractor for development of the environmental impact statement, has completed the preliminary draft document, which will be available for future reference

The Navy has decided that it will become the lead agency on an environmental impact statement covering naval spent nuclear fuel. The Navy's environmental impact statement will analyze a container system that will provide for the management of greater than Class C low-level radioactive waste. The Department will participate as a cooperating agency. Since all naval spent fuel is shipped to and stored at Idaho National Engineering Laboratory, the evaluations will be specific to that location.

Dry Transfer System. We plan to demonstrate the spent fuel dry transfer capability and submit a topical safety analysis report on its design to the Nuclear Regulatory Commission. Over the last few years, we have been working with the Electric Power Research Institute on the design of a dry transfer system for spent nuclear fuel. The system will enable the transfer of individual spent fuel assemblies between conventional, top-loading casks and canister systems.

The Electric Power Research Institute delivered a final design report to the Department in December 1995, and a draft Topical Safety Analysis Report was received on March 7, 1996. We plan to submit the topical report to Nuclear Regulatory Commission staff later this year for review and acceptance. We are currently negotiating an agreement with the Idaho Operations Office of the Department's Office of Environmental Management regarding a cost-shared project to fabricate and demonstrate the dry transfer system at the Idaho National Engineering Laboratory. The system could assist the Department in meeting its near-term spent fuel management commitments to the State of Idaho. It could also benefit early operations at any interim storage facility. Our intent is to complete prototype fabrication and to start the demonstration by mid-1998.

Program Management. In FY 1996 we will complete our revision to the 1994 Program Plan The revised plan will set forth the revised program strategy, work scope, major milestones, and schedules in accordance with direction provided with the FY 1996 appropriation.

Program Integration. Through the remainder of FY 1996, we will continue to improve the integration of program activities by: (1) awarding a new integrated technical and management support contract which will consolidate existing contracts for support of the Federal staff at both business centers and the management center; (2) consolidating program participant quality assurance procedures; (3) updating contractual reporting requirements; and (4) implementing a single, integrated program planning and control system. In addition, the program will be managed as one integrated, strategic system in response to the Secretary's new initiative to strengthen the Department's project management system.

Defense Waste Fee. In the near future, we will complete and issue the Defense Waste Fee Adequacy Report, which is used to determine an appropriate defense contribution to the development of the radioactive waste management systems for the disposal of high-level radioactive waste The fee is based on an our updated estimate of the systems's total life cycle cost

APPLICATION OF THE FY 1997 BUDGET REQUEST

The budget request for FY 1997 underscores the Administration's continued commitment to geologic disposal. The funds requested will allow us to resolve the technical questions concerning the viability of the construction and operation of a repository at Yucca Mountain by 1998; regain a target of 2002 to file a license application with the Nuclear Regulatory Commission for construction of the repository; and develop the strategies and establish the capability to quickly respond to new policy directions on interim storage.

The overall FY 1997 budget request for the program is $400 million, which consists of a $200 million appropriation from the Nuclear Waste Disposal Fund and a $200 million appropriation for Defense Nuclear Waste Disposal Activities. This represents an effective increase of $85 million over the amount available to us from the FY 1996 Appropriation of $315 million.

Yucca Mountain. The FY 1997 budget request for the Yucca Mountain Site Characterization Project is $339 million, compared to $250 million in FY 1996. This represents an increase of $89 million, more than the total program funding increase we are requesting.

The FY 1997 funding will be applied most heavily toward work on the critical elements of the repository evaluation, including the development of an updated total system performance assessment; design of the repository and waste package in sufficient detail to evaluate its feasibility and performance; resolution of critical unresolved issues in the waste isolation strategy, criticality control, and thermal loading; development of site investigation synthesis reports and updated process models; completion of the excavation for the exploratory studies facility; and collection of required test data.

In FY 1997, we will also continue work on updating the regulatory requirements that govern the repository licensing process and considering the regulatory revisions that would be needed to clarify our intentions. The existing regulations were established more than a decade ago and in different policy and technical settings that exist today. Since their initial promulgation, an enormous amount of data has been collected and analyzed at Yucca Mountain. From that data, we have gained a more coherent understanding of what is required to complete a technically defensible license application. A more directed approach to licensing would allow us to set the target date for a license application in 2002, given a sustainable level of program funding.

Operations and Construction. Operations and construction includes excavation within the exploratory studies facility; tunnel boring machine operations and maintenance; and the Project's safety and health program.

During FY 1997, we will complete the underground five mile exploratory studies facility loop and the second alcove to provide access to the Ghost Dance fault at the south end. The completed loop will allow testing and evaluation of the geology and hydrology of the southern portion of the proposed repository. We will complete excavation of the heater test alcove We will construct limited facilities at the north and south portal to support construction and operation of the exploratory studies facility. Boreholes will be drilled to provide data for the design of an east-west drift, if one is needed, and to improve our understanding of the distribution of rock units and faults in this area. We will procure contractor support and equipment for construction of smaller scale drifts at the repository horizon, if necessary. Underground and on-site safety services will be provided for construction activities as well as environmental management of hazardous waste accumulation facilities, hydrocarbon contaminated soil maintenance and disposal, and conducting surveillance of site activities to ensure compliance with environmental regulations and requirements. Emergency medical services and fire prevention programs will be maintained to support field activities

Core Science. Core Science includes scientific test planning and design; collection of scientific and environmental data; laboratory experiments; site and materials performance testing; and modeling and data analysis. These activities are intended to support preparation of the Yucca Mountain viability assessment, and assuming a positive assessment, a future site recommendation, NEPA determination, and licensing documentation.

During FY 1997, additional data collection activities will focus on gaining a better understanding of the repository's waste containment and isolation capabilities. This data will be used to constrain and evaluate flow models for the site. Additional boreholes will be drilled to provide information on rock properties, deep stratigraphy and saturated zone to support three dimensional geologic, hydrologic, tectonic, and volcanism modeling efforts. Saturated hydrologic zone testing will be conducted to investigate water movement across faults, to complete tracer tests at the C-wells, and to study the deep aquifers downstream from the repository block.

Seismic, stream flow, pneumatic, and meteorological data will be collected to record transient events such as earthquakes, floods, and major storms. Additional aquifer tests will be conducted to characterize the steep hydraulic gradient at the north end of the repository block as input into the regional saturated zone hydrologic model. Hydrologic testing in the first Ghost Dance fault alcove will be initiated to observe potential groundwater flow paths through or past the repository horizon. This will provide data crucial to the issue of fast flow paths through the unsaturated zone. Hydrologic testing will continue in alcove No. 2 (Bow Ridge Fault) and alcoves Nos. 3 and 4 (upper and lower contact boundaries of the Paintbrush Tuff non-welded formation) to study water movement above the repository horizon. The drift scale heater test will be installed and the heaters turned on during FY 1997. The drift scale heater test will be designed to approximate an actual emplacement drift. Thermal, hydrologic, geochemical, and geomechanical parameters will be monitored during the test and data will be used to evaluate potential impacts on the near field environment.

Design and Engineering. Design and Engineering activities include the coordination and planning of exploratory studies facility, repository and waste package designs, including waste form and package modeling; performance testing; quality assurance oversight and training; and the preparation of program cost estimates.

During FY 1997, selected aspects of the waste package, surface, and subsurface designs will be advanced to resolve key issues that will allow us to demonstrate in 1998 that the construction, operation, and closure of the repository are technically feasible. The design information we compile over the next few years will also be the basis for our assessment of the expected performance of the system in terms of radiological safety and waste isolation. Outputs of this design phase will also support the evaluation of the additional design work that may be needed to support our license application for construction of a repository and the preparation of an updated cost estimate for construction and operation of a repository. Waste package enhancements will include work in fabrication development, probabilistic criticality analysis, materials, and waste form testing.

In FY 97, we will also complete the Thermal Loading System Study. The study will provide the technical basis to support the decision of how much heat-generating waste can be disposed of in a given repository area. The study will evaluate performance, cost and schedule of the thermal management options. The study will also indicate how thermal loading flexibility can be achieved and when decisions must be made so that significant costs or schedule constraints are not incurred.

Performance Assessment. Performance assessment includes the calculations and modeling associated with total system and subsystem performance analysis; and management and control of the supporting technical databases.

Our next assessment of system performance, which is being scheduled for the 1997-1998 time-frame, will be based more directly on the process-level models that we are developing for the site and engineered system. A more sophisticated biosphere model is also expected to be in place to allow calculation of dose and the associated risk to a representative individual in an affected population. The objective for this assessment is to evaluate both the expected performance of the system as well as the ranges of probabilities of radiation release, dose, and resulting consequences.

The 1997-1998 assessment will consider and reflect the site and engineered system process-level understanding and data available at that time. It will, therefore, represent the best estimate of system performance that we are likely to have for some time to come.

Regulatory Process. We will reinitiate support activities to regain our target to file a license application in 2002. We will issue a final rule revising the repository siting guidelines (10 CFR Part 960).

NEPA Compliance. Compliance activities primarily consist of holding scoping meetings; reviewing and responding to public scoping comments; completion of data gathering; maintaining technical interfaces; consultations with other agencies and Native American Indian Tribes; and modeling and impact analysis, all of which would lead to development and issuance of a draft repository environmental impact statement. These activities would also be conducted for the final environmental impact statement (including a public comment response document) and a Record of Decision.

Related NEPA activities were suspended in FY 1996. We will reinitiate them in FY 1997 with the award of a technical support contract to collect, interpret, and analyze data required for the preparation and review of the draft and final repository environmental impact statements, scheduled for completion in FY 1999 and FY 2000 respectively. In FY 1997, we will also begin to address NEPA information needs through data collected from our core science, design and engineering, and performance assessment activities.

Project Management. The objective of Project management is to provide the requisite level of Project control and support at minimum cost to assure that the maximum amount of funds are available for core science, design and engineering, performance assessment, and NEPA compliance activities. Project management includes the planning, budgeting, scheduling and funds management of all Project activities, facilities operation, site security, administrative support services, telecommunications and rent payments; records management and computer procurement, maintenance and operation; operation of local and wide area communication networks; motor pool operations; and to conduct public information and outreach activities.

Waste Acceptance Storage and Transportation. The FY 1997 budget request for Waste Acceptance, Storage and Transportation is $10.0 million, compared to $13.6 million in FY 1996. This category includes five line items from the Congressional Budget submission: Spent Fuel Storage, Transportation, Waste Acceptance, Multi-Purpose Canister subsystem, and Project Integration. The request for Spent Fuel Storage is $2.3 million, compared to $1.0 million in FY 1996; Transportation is $2.5 million, compared to $5.1 million in FY 1996; Waste Acceptance is $2.7 million, compared to $2.3 million; Multi-Purpose Canister subsystem will be terminated in FY 1996; and the request for Project Integration is $2.4 million, compared to $3.4 million in FY 1996.

In FY 1997, the Waste Acceptance, Storage and Transportation Project will forge a market-driven waste acceptance and national transportation strategy, and will address the non-site-specific and long-lead time activities that must precede any near term removal of spent nuclear fuel from reactor sites once a Federal facility becomes available.

Market-Driven Waste Acceptance and Transportation Strategy. In FY 1997, we plan to begin discussions with industry on an initiative to create the necessary national transportation capability to remove spent nuclear fuel from locations throughout the United States to a centralized interim storage or permanent disposal facility. An acquisition strategy that relies on the private sector for transportation and waste acceptance equipment and services will be developed. We will solicit Expressions of Interest in one or more publications such as the Federal Register, Commerce Business Daily, and trade journals to garner industry and vendor views on the proposed strategy. Under this approach, we will be prepared to issue requests for proposals and award fixed-price, multi-year, performance-based contracts to the private sector for equipment and services to carry out certain functions under the Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste (10 CFR Part 961), to accept spent fuel at utility sites for delivery to a Federal facility, and to provide the technical and management capability to maintain a National transportation effort.

Non-Site-Specific and Long Lead Time Work. Our non-site-specific work related to storage will continue in FY 1996 and FY 1997. We will maintain our standard contracts and interactions with utilities, continue the collection of utility data, establish the sequence and amounts of spent fuel to be transferred to the Department, and review utility reports that identify assemblies to be picked up. "Long lead time" activities that must precede acceptance, and subsequent shipment, of spent nuclear fuel from reactor sites will be addressed. We will integrate Federal spent nuclear fuel and defense high-level radioactive waste into the program's plans for waste acceptance, storage, and transportation; and complete a memorandum of agreement with the Department's Office of Environmental Management to establish the process for determining the type, quantity, priority, and fee for their spent fuel and high-level radioactive waste.

Our interim storage readiness capability will be based upon a phased interim storage facility consistent with the concept developed in Congressional debate. We will address the technical, safety, and procedural issues involved in licensing an interim storage facility to expedite the process and reduce the cost for facility development when an interim storage site is designated. An example of this type of activity is a generic topical safety analysis report for the interim storage facility that should resolve issues and thereby expedite the Nuclear Regulatory Commission licensing schedule when a specific site is identified.

Program Management. The FY 1997 budget request for Program Management is $50.7 million, compared to $51.4 million in FY 1996. This funding includes $1.9 million for Quality Assurance, $8.1 million for Program Management and Integration, $10.2 million for Human Resources and Administration, and $30.5 for Program Direction which includes Federal salaries and administrative support. The Program Management and Integration component is about 12.6 percent of the total program budget for the year, down from 16.3 percent in FY 1996, and 17.3 percent in FY 1995. This reflects our continuing efforts to reduce these costs and make a greater share of our funding available to our two business centers.

Program Management consists of activities and tasks that support all of the program element areas. From an organizational perspective, Program Management elements include the traditional areas of management and control, quality assurance, systems integration, regulatory integration, human resources and administration, and Federal salaries. These elements provide administrative support and strategic planning for, as well as cross-cutting issues affecting both the Yucca Mountain Site Characterization and Waste Acceptance, Storage and Transportation Projects.

In FY 1997, an emphasis will be placed on increasing the capability of Federal staff to function with a decreasing reliance on contractor support; improving the program's management tools (e.g., schedules, baselines, change control, performance review, and reporting processes) to increase the efficiency of applying reduced funding levels to program priorities both in planning and in operations; addressing a number of cross-cutting technical issues; improving the functional linkages across the program through increased integration; and improving access to the data and information needed to effectively manage the program.

Our quality assurance activities will continue to support the Yucca Mountain Site Characterization effort, repository design, and the revisions to our technical baselines. Our systems integration work will ensure that the interface requirements between the repository and the interim storage and transportation components of the radioactive waste management system are adequately addressed and alternative system design proposals are prepared and evaluated. As progress is made in site characterization, repository design activities, and transportation and interim storage efforts, the latest concepts will be incorporated into system operation studies and models. These will be used to evaluate the impact of repository design and operational concepts on the overall waste system. System cost tradeoffs, waste logistics, and storage options will also be examined.

With regard to regulatory integration, we will coordinate and participate in interactions with the Nuclear Regulatory Commission staff to address management and technical issues related to the repository program, interim storage, and the transportation of spent nuclear fuel and high-level radioactive waste. Our planning activities will focus on responding to Administration and Congressional inquiries regarding program status, policies, and updating the program's policies and plans. We will complete the FY 1997 total system life cycle cost report and conduct an FY 1997 Defense Waste Fee Adequacy Analysis and publish the report. We will also continue to improve program and project management systems by updating program and project cost and schedule baselines, schedule networks, and bases of estimates. In the area of Human Resources and Administration, in early FY 1997, we will award a contract for a consolidated technical support services contractor to improve performance at reduced funding levels. We will also update our quality assurance training course outlines, instruction guides, and lesson plans and conduct essential quality assurance training; develop and submit the program's annual report to Congress on FY 1996 activities and expenditures; develop and submit an audited financial statement for Nuclear Waste Fund management; and continue to integrate information management activities across program locations.

SPECIAL BUDGETARY CONSIDERATIONS

Payments to State of Nevada and Units of Local Government. We do not intend to make FY 1996 payments to the State of Nevada and the units of local government affected by the Yucca Mountain site characterization project under the provisions of Section 116(c) of the Nuclear Waste Policy Act (the Act).

However, as we have informally advised your staff, we do intend to enter into an agreement, under other authority, with Nye County to perform on-site testing and data gathering activities that we believe are important to our ongoing characterization efforts. Maintenance of the continuity of this scientific work during FY 1996 is important to our program. The cost of this work will be approximately $631,000.

We believe that the support envisioned by Section 116(c) of the Act to the State and units of local government affected by site characterization activities is important in enabling local governments and the citizens most directly impacted by the Yucca Mountain Project to remain informed and to participate in a meaningful way in the day to day program actions that affect them. Financial support is particularly important for the rural counties' programs where financial resources are severely limited.

We hope to resolve the policy regarding the future funding of the affected governments in the course of consideration of the FY 1997 budget.

Cooperative Agreements. The program funds ten formal cooperative agreements with regional, national and technical organizations to address institutional and technical issues relating to the transportation, storage, and disposal of commercial spent fuel and high-level radioactive waste. Public participation and the exchange of valuable information is facilitated through these agreements. Due to budget reductions in FY 1996, we reviewed each of the agreements and funding for each organization was reduced to about one-third of the FY 1995 level. Our plan for FY 1997 is to continue to fund these organizations at these reduced levels. I am submitting for the record a table that presents the funding provided to each organization in FY 1995 and FY 1996, and the planned FY 1997 level.

Dry Storage Research. The Department maintains spent nuclear fuel in storage casks at the Idaho National Engineering Laboratory. This spent fuel has been in dry storage longer than any other fuel in this country. The casks are routinely monitored to provide information regarding the behavior of the spent fuel in storage and could provide valuable information for licensing by the Commission of extended dry storage. This work has historically been funded from the Civilian Radioactive Waste Research and Development Appropriation. The FY 1996 appropriation did not provide funds to continue this activity and we are not requesting an appropriation for FY 1997. We have asked the Department's Office of Environmental Management staff to consider taking over this project, and remain hopeful that this important data series can be maintained.

CONCLUDING REMARKS

With your approval of our FY 1997 budget request, I am confident that the direction we are now taking will, in the FY 1998 - FY 1999 time frame, answer the important outstanding technical questions regarding the feasibility of building the repository.

If there is an aspect of the geologic setting that seriously contradicts our expectations about the performance of a repository at Yucca Mountain, we are likely to discover it by FY 1998 - FY 1999. If there are shortcomings in the available technologies or in our engineering ability to implement the repository design concepts, they will be evident by then. With adequate funding and an updated regulatory process for repository licensing, I am also confident that we can regain a target date of 2002 for the submittal of a competent license application to the Nuclear Regulatory Commission. The level of funding that we are requesting for FY 1997 will enable us to embark upon a program with that objective.

Also, I believe that the concepts that we are developing in FY 1997 for a national transportation system and an interim storage facility are consistent with the policies expressed by the Congress and that they will result in the most efficient path forward.

As we reduce the remaining scientific and technical uncertainties concerning geologic disposal at Yucca Mountain, society's ability to evaluate the geologic disposal option will become much less philosophical and much more practical. It will become very clear by FY 1998 - FY 1999 how the geologic disposal option compares to alternatives for the long-term management of spent fuel and other high-level waste forms. We believe that the responsible course of action is to place the near-term priority upon completion of the work necessary for a sound assessment of the viability of the geologic repository. With that information, we will be able to make a reasoned decision on the best approach to interim storage in a way that is objective and fair to all our citizens.

Thank you for your attention.

SUBMITTED FOR THE RECORD
COOPERATIVE AGREEMENT FUNDING
FY 1995 - FY 1997

Organization	FY 1995	FY 1996	FY 1997
Commercial Vehicle Safety Alliance	264,000	91,000	91,000
Conference of Radiation Control Program Directors	132,000	44,000	44,000
Council of State Governments/Eastern Regional Conference	44,000	46,000	46,000
Council of State Governments-Midwestern Office	158,000	52,000	52,000
League of Women Voters Education Fund	138,000	46,000	46,000
National Association of Regulatory Utility Commissioners	630,000	210,000	210,000
National Conference of State Legislatures	520,000	173,000	173,000
National Congress of American Indians	534,000	178,000	178,000
Southern States Energy Board	147,000	50,000	50,000
Western Interstate Energy Board	147,000	49,000	49,000
Total	$2,714,000	$939,000	$939,000

U.S. Department of Energy
Office of Public Affairs
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202/586-3640

BIOGRAPHY

DANIEL A. DREYFUS

Dr. Daniel Dreyfus was nominated by President Clinton to serve as the Director, Office of Civilian Radioactive Waste Management (OCRWM), U.S. Department of Energy (DOE) on September 7, 1993, and was confirmed by the United States Senate on October 7, 1993.

In this position, Dr. Dreyfus is responsible for the development and execution of a program for the acceptance, transportation and storage and ultimate disposal of the spent fuel from the Nation's commercial nuclear powerplants. The program is also responsible for the ultimate disposal of highly radioactive waste resulting from the cleanup of the nuclear weapons complex.

Since February 1993, Dr. Dreyfus served as a Special Assistant to the Secretary of Energy. Prior to that, he was Vice President, Strategic Planning and Analysis, for the Gas Research Institute, a non-profit organization which plans and manages a comprehensive research and development program on behalf of the natural gas industry. He also served as President and CEO of Gas Technology Information, Inc., which is the operating agent for the International Center for Gas Technology Information, formed under the auspices of the International Energy Agency. He has held engineering and management positions in industry and in the executive and legislative branches of the federal government, including 14 years as professional staff member and Staff Director of the Senate Committee on Energy and Natural Resources.

After enlisted infantry service in Korea, Dr. Dreyfus was commissioned in the Corps of Engineers, U.S. Army Reserve. He is a member of the American Society of Civil Engineers, the Society of American Military Engineers, the Society of Professional Engineers, the American Political Science Association, and the American Society for Public Administration.

Dr. Dreyfus attended public schools in a number of states, and graduated from the Meguro High School in Tokyo, Japan. He received a Bachelor of Civil Engineering degree and a Master of Engineering Administration degree from George Washington University. He also received a Doctor of Philosophy degree from American University.

Dr. Dreyfus was born in Brooklyn, New York, March 5, 1931. He is married to the former Josephine Sime. They have five children and two grandchildren, and reside in McLean, Virginia.

October 1993

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Statement for the Record

Dr. John E. Cantlon, Chairman
Nuclear Waste Technical Review Board

submitted to the

Subcommittee on Energy and Water Development
Committee on Appropriations
U.S. House of Representatives

March 26, 1996

Statement of
Dr. John E. Cantlon, Chairman
Nuclear Waste Technical Review Board
March 1996

Chairman Myers and members of the Subcommittee, I am John Cantlon, Chairman of the Nuclear Waste Technical Review Board and former vice president for research and dean of the graduate school at Michigan State University. Thank you for this opportunity to present the Board's appropriation request for fiscal year 1997.

As you know, Mr. Chairman, Congress created the Nuclear Waste Technical Review Board (the Board) in the Nuclear Waste Policy Amendments Act (NWPAA) of 1987 as an independent executive agency and assigned it the responsibility of providing an unbiased and expert evaluation of the technical and scientific aspects of the Department of Energy's (DOE) efforts to manage and dispose of our nation's spent fuel and high-level radioactive wastes. The Board's mission is simply stated in the NWPAA, as follows.

> *The Board shall evaluate the technical and scientific validity of activities undertaken by the Secretary after the date of the enactment of the Nuclear Waste Policy Amendments Act of 1987, including (1) site-characterization activities; and (2) activities relating to the packaging or transportation of high-level radioactive waste or spent nuclear fuel.*

The DOE's Office of Civilian Radioactive Waste Management (OCRWM) is responsible for transporting and disposing of our nation's high-level nuclear waste — 85,000 metric tons of spent fuel from civilian nuclear plants, along with about 8,000 metric tons of high-level defense waste and a smaller amount of government-owned spent fuel. As directed in the NWPAA, the DOE is characterizing a site at Yucca Mountain, Nevada, to determine its potential suitability for construction of a permanent repository for these wastes.

Since 1989, when the original Board members were appointed, the Board has brought a high level of technical and scientific expertise to its review of this program, which the Board believes is of significant national importance. In my statement today, Mr. Chairman, I will provide a summary of the Board's fiscal year 1997 appropriation request of $3,214,000. This amount establishes a viable baseline for future funding, which the Board does not now have, and ensures that the Board will be able to effectively continue its important work.

However, before I get into the specifics of the Board's appropriation request, Mr. Chairman, I would like to comment on encouraging progress that is being made in the Yucca Mountain site-characterization program. I also would like to bring to the Subcommittee's attention some Board concerns about proposed program changes that are being considered just as previous investments in the program are beginning to show tangible results. I have attached to this statement a summary of conclusions and recommendations made in a report released by the Board on March 20, 1996, to Congress and the Secretary of Energy entitled *Disposal and Storage of Spent Nuclear Fuel — Finding the Right Balance*. The report, copies of which have been delivered to your individual offices, explains in detail the basis for the Board's concerns about proposed changes to the civilian radioactive waste management program.

Mr. Chairman, I ask that my full statement and the attachments referred to be included in the record of these hearings.

Recent Progress at Yucca Mountain

Consistent with its congressionally established mandate, the Board reported in the attached February 15, 1996, letter to Congress and the Secretary of Energy on the DOE's progress in excavating underground at Yucca Mountain. The program has been able to improve significantly the advance rates of the tunnel boring machine, which is excavating at the geologic level of the proposed repository. As a consequence, the program is acquiring important data about the suitability of the site. Board members have examined the tunnel rock at the repository level and can report that, so far, nothing has been identified that would indicate that the site is unsuitable. Important testing will soon be initiated underground, and overall the Board is very encouraged by progress at the site.

The DOE also has made strides in developing a coherent and testable waste isolation strategy. The strategy is becoming increasingly well defined and more understandable. Together with recent advances in performance assessment, this strategy should enable the OCRWM to undertake an aggressive delineation of program priorities and allocate available funds more efficiently among the various activities of the scientists and engineers working on the program.

gram management continues to improve, as well, as evidenced by the improved performance of the tunnel boring machine and the increased emphasis on setting priorities among site studies. Although room for further improvement remains — especially in program integration and in defining the roles of government versus contractor participants — the Board believes there is a clear trend toward more efficient management of the program.

Despite these very promising program developments, it has become increasingly clear that the civilian radioactive waste management program is fast approaching a critical crossroads. As a result of political and budgetary concerns, the authorizing and appropriating committees of both Houses of Congress have signalled that a change of primary program focus — from disposal to storage — is a near-term possibility.

The Board would be concerned if such a shift were to occur. We believe that, using the right approach, *it is possible to find the right balance and integration between storage and disposal.* The nation's future storage needs can be addressed while keeping the national goal of permanent disposal of *all* spent fuel and high-level reprocessing wastes on track. Although the nation will clearly need a fully operating centralized storage facility, especially when utility reactors begin shutting down in large numbers, the Board believes it is equally necessary to maintain the recent pace of site-characterization and repository development activities for the next several years.

Board Membership, Role, and Operation

Mr. Chairman, technical and scientific oversight such as that provided by this Board is especially critical now that site-characterization activities at Yucca Mountain are being constrained by budgetary limitations. Site-characterization activities, repository design and total system performance assessment, and transportation and storage of the waste, must be integrated into a comprehensive system for managing spent fuel and high-level radioactive waste. Such a system begins at reactor sites — where the spent fuel is packaged for storage and eventual transport — and ends with the final closure of the repository as many as 100 years after the spent fuel is placed underground. In between are numerous complex and diverse activities related to spent fuel and high-level radioactive waste management and repository operation and performance whose technical validity will largely determine the success of the civilian radioactive waste management program. Recognizing the critical need for technical and scientific oversight of the development of this waste management system, Congress required in the 1987 Amendments Act that the Board "shall be representative of the broad range of scientific and engineering disciplines related to activities under this title." In accordance, Board member capabilities include expertise in geology, geoengineering, hydrology, materials science, geochemistry, transportation, systems analysis, environmental science, risk and performance assessment, and public health and safety. Drawing on this expertise, the Board has provided an in-depth evaluation of many technical and scientific aspects of the DOE's civilian radioactive waste management program, including the following.

- The site-specific waste isolation strategy for the proposed repository and methodologies for assessing repository performance
- Surface-based and underground exploration and testing activities at the Yucca Mountain site
- Integration of the various components of the program into a comprehensive waste management system
- Repository design
- Waste package design and materials testing
- Transportation and handling
- Technical and system interactions among spent fuel packaging, storage, transportation, handling, and repository design and operation.

Board members are appointed by the President from a list of candidates nominated by the National Academy of Sciences. The first Board members were appointed on January 18, 1989. The current Board consists of nine members. In addition, two former members are used when their expertise is needed as consultants pending new appointments. The Board appreciates very much recent efforts of Chairman Myers that resulted in a change in procedure allowing Board members whose terms have expired to serve until new members have been appointed to replace them. (A list of current Board members and consultants is attached to this statement.)

In conducting its reviews, the Board sponsors regular meetings to which it invites representatives of the DOE and its contractors, regulatory agencies such as the Nuclear Regulatory Commission (NRC), the state of Nevada, area Native Americans, the nuclear industry, nuclear utilities, and state utility regulators. Input from congressional staff at the Board's October 1995 meeting was especially helpful. Board members and staff also conduct routine examinations of the on-site geologic, hydrologic, engineering, and ecological studies as well as features of the proposed repository site at Yucca Mountain. When relevant, Board members and staff attend or participate in pertinent technical conferences, symposia, and workshops.

One very important role the Board plays is that of catalyst for the technical community. By scheduling open, public meetings and asking detailed technical questions of the program participants, the Board is able to affect the DOE's technical and scientific program as it unfolds. The Board helps the DOE to continuously reevaluate its own activities, to reexamine the fundamentals of the program, to revise priorities, and to define the program's technical objectives. The Board has been instrumental in increasing communication and coordination within this DOE program and among DOE contractors and other organizations involved with or concerned about spent fuel and high-level radioactive waste disposal issues.

Fiscal Year 1997 Appropriations Request

To enable the Board to continue its evaluation of this critical national program, the Board's funding requirement for fiscal year 1997 is $3,214,000 in new budget authority. (Attachment #5 provides a detailed explanation of this request.) This amount will meet the Board's total funding requirements for fiscal year 1997 and establish a viable baseline for out-year funding, which the Board does not now have.

The objectives underlying this budget request are the following.

- Support the efforts of the Board members who are heavily involved in a congressionally mandated review of the DOE's technical and scientific activities related to the management of commercial spent fuel and defense high-level radioactive wastes

- Maintain a small professional and support staff of the highest caliber commensurate with the status, abilities, and responsibilities of the congressionally established, National Academy of Sciences selected, and Presidentially appointed Board, which it supports

- Provide the tools and the resources for the Board and staff to effectively pursue in a timely fashion the mission with which Congress has charged the Board in the Nuclear Waste Policy Amendments Act.

Historically, Board funding has been satisfied by a combination of appropriated new budget authority and carryover funds from prior years that resulted primarily from unfilled Board member and staff positions. Until now, each budget year, the Board has requested only that new budget authority (appropriation), which, when supplemented by unobligated balances (carryover), was necessary to meet its funding needs. For example, in fiscal year 1996, the Board's total funding was $3,169,000 ($2,531,000 in new budget authority). However, because the Board is now fully staffed, for fiscal year 1997, instead of using the unobligated balance from fiscal year 1996 (approximately $448,000) to supplement its request, the Board is requesting its *total* funding requirement of $3,214,000 in new budget authority. *This will establish a viable baseline for the Board's out-year funding.* If the out-year funding baseline were similar to the appropriations of new budget authority in fiscal years 1995 ($2,664,000) and 1996 ($2,531,000), both of which were supplemented by carryover funds, the Board would fall considerably short of the amount needed to meet its anticipated oversight responsibilities.

The fiscal year 1997 budget request assumes a full 11-member Board operating with a targeted staffing level of 20 (a 10% reduction from fiscal year 1996).

Conclusion

In closing, Mr. Chairman, let me state for the record that site-characterization activities being conducted at the Yucca Mountain site have so far revealed no characteristics of the site that might indicate that it is unsuitable for repository development. However, it will be necessary to complete additional underground exploration and testing at Yucca Mountain before the DOE can make a technically credible final decision about the suitability of the site for repository development. Even if the site is found suitable, additional confirmatory design, experimental data, and assessment activities will be required to support an eventual application to the NRC for construction authorization.

After years of criticism, often from our Board, the DOE is beginning to obtain underground data from the site at the level of the proposed repository. If strong program management continues, if sufficient and consistent funding are provided, and if the program can maintain its recent rates of progress, enough underground exploration, testing, repository design, and analysis can be completed to permit the DOE to make a decision within five years on the suitability of the site for repository development.

The Board believes that maintaining the program's primary focus on the evaluation of the Yucca Mountain site and on developing a credible repository development program is the best way to ensure the responsible management of all of the nation's spent fuel and high-level radioactive waste. Having a credible disposal option also should help to ensure the long-term success of any future storage initiatives. We, therefore, urge Congress to continue to support permanent disposal as the primary objective of the civilian radioactive waste management program and to provide the program with sufficient and consistent funding.

Thank you, Mr. Chairman, for this opportunity to present this statement to the Subcommittee. The Board would be pleased to answer for the record any questions you may have.

Attachments:

1) Attachment A: List of Board members and consultants
2) Attachment B: Interim storage report - Summary of conclusions and recommendations
3) Letters to Secretary of Energy and Congress: December 1995 and February 1996
4) Letters to Dr. Daniel Dreyfus: December 1994 and December 1995
5) Details of Congressional budget request
6) *Disposal and Storage of Spent Nuclear Fuel — Finding the Right Balance* - Executive Summary, March 1996

Attachment A

Nuclear Waste Technical Review Board
Members and Consultants

- Dr. John E. Cantlon, Chairman, is vice president emeritus of research and graduate studies and former dean of the graduate school at Michigan State University, East Lansing. His field of expertise is environmental science.
- Dr. Clarence R. Allen is professor emeritus of geology and geophysics at the California Institute of Technology, Pasadena, where he has served as director of the Seismological Laboratory and chairman of the Division of Geological Sciences.
- Mr. John W. Arendt of Oak Ridge, Tennessee, is senior consultant and founder of John W. Arendt Associates, Inc. and a specialist in safety, quality assurance, handling and processing of uranium.
- Dr. Garry D. Brewer is professor of resource policy and management and former dean of the School of Natural Resources and Environment at the University of Michigan, Ann Arbor.
- Dr. Jared L. Cohon, is the dean of the School of Forestry and Environmental Studies and professor of environmental systems analysis and mechanical engineering at Yale University.
- Dr. Edward J. Cording is professor of civil engineering at the University of Illinois at Urbana - Champaign and a specialist in rock engineering and underground engineering.
- Dr. Donald Langmuir is professor emeritus of geochemistry at the Colorado School of Mines in Golden and a specialist in ground-water geochemistry.
- Dr. John J. McKetta, Jr. is the Joe C. Walter Professor of Chemical Engineering emeritus at the University of Texas, Austin.
- Dr. Jeffrey J. Wong, is science advisor to the director of the Department of Toxic Substances Control of the California Environment Protection Agency, Sacramento, and a specialist in hazardous substance risk assessment and scientific team management.

The following two members whose terms expired in April 1994 have been retained as consultants until appointments to the vacant positions have been made by the White House.

- Dr. Patrick A. Domenico is the David B. Harris Professor of Geology at Texas A&M University, College Station, and a specialist in ground-water hydrology.
- Dr. Ellis D. Verink, Jr. is a Distinguished Service Professor of Metallurgical Engineering emeritus and former chair of the Department of Materials Science and Engineering of the University of Florida, Gainesville, and a specialist in corrosion.

Attachment B

Interim Storage Report
U. S. Nuclear Waste Technical Review Board
Summary of Conclusions and Recommendations

After reviewing about two-dozen technical and nontechnical issues, the Board believes that it is possible to find the right balance between disposal and storage. If the following approach is used, both short- long-term spent fuel storage needs can be addressed in a way that keeps the goal of repository development or permanent disposal on track.

First, the Board sees no compelling technical or safety reasons to move spent fuel to a centralized storage facility for the next few years. The methods now used to store spent fuel at reactor sites are safe and are likely to remain safe for decades to come. Despite some recent public opposition to utility efforts to develop additional storage, so far, utilities have been able to add new storage capacity at their sites when needed.

However, the Board believes that federal storage capacity will be needed in the future for two reasons. First, when a repository begins operating, a centralized storage capability will be needed to provide added flexibility to handle the waste. For example, storage would provide a buffer between the repository and the rest of the waste management system if waste emplacement rates in the repository are less than spent fuel acceptance rates. Storage capacity also offers technical advantages, such as allowing spent fuel to be mixed and matched to optimize the thermal loading of the repository to improve repository performance.

Second, commercial spent fuel storage needs will change markedly beginning around 2010. Until then, approximately 15,000 metric tons of new storage capacity will be needed at reactor sites. But beginning around 2010, large amounts of dry-cask storage will be required to allow removal of spent fuel from the storage pools of reactors that are being shut down. It is at this time that a federal storage facility operating at full scale will be most useful. A centralized facility will relieve utilities of the need to build new dry-storage capacity at shutdown reactors while accommodating any future institutional or technical uncertainties associated with the long-term storage of spent fuel.

Although currently prohibited by law, there is no *technical* reason why a centralized storage facility (and supporting transportation infrastructure) cannot be constructed prior to repository construction. In fact, because of the lead time needed for planning and development, the Board believes it would be practical to begin planning now for a federal storage facility(s) that can achieve full-scale operation (i.e., accept 3,000 metric tons/year) by 2010 when reactors begin shutting down in large numbers.

In the past whenever there has been a choice between storage and disposal, disposal has always been made the primary focus of the federal high-level waste management program. This is because the storage of commercial spent fuel is not an acceptable substitute for disposal. Ultimately, spent fuel (commercial and defense) as well as sizable amounts of high-level radioactive reprocessing waste will have to be disposed of. The Board believes that the nation needs both sustained progress toward a repository and a plan to address future spent fuel storage needs. However, efforts now to refocus the program from disposal to storage, especially at a time when budgets are tight, could jeopardize site-characterization and repository development efforts in three ways: (1) by competing with the disposal program for resources, (2) by causing a real or perceived prejudicing of a future decision about the suitability of the Yucca Mountain site, and (3) by eroding the impetus and political support for repository development.

Given the current stage of the Yucca Mountain site-characterization program and the fact that substantial new storage capacity will not be needed until 2010, the Board has concluded that it makes technical, management, and fiscal sense to await the decision on the suitability of the Yucca Mountain site for repository development before beginning development of a full-scale federal centralized storage facility. The Board believes that the following approach strikes the right balance between maintaining the national goal of permanent disposal while meeting future storage needs.

- *Disposal*: The nation has a program for developing a repository for the permanent disposal of spent fuel. So far, no technical reasons have been found for abandoning the site being characterized at Yucca Mountain. The Board believes that if the DOE can maintain the recent pace of underground exploration, testing, and analysis, sufficient information should be available to determine within five there is a high probability that the site, along with the appropriate engineered barriers, can provide long-term waste isolation. Therefore, the Board recommends that for the next several years the DOE continue to focus its primary efforts on evaluating the suitability of the Yucca Mountain site for repository development.

- *Storage*: The Board recommends that generic planning for a federal storage facility and for a supporting transportation infrastructure begin now at a funding level modest enough to avoid competition with the repository program. Development of a large centralized storage facility should be deferred until after a decision has been made about the suitability of the Yucca Mountain site for hosting a repository. Because of the increased advantages of having a storage facility located at an operating repository site, if Yucca Mountain proves suitable for repository development, the centralized storage facility should be located there. With adequate prior planning, activities could begin around 2000 to construct a storage facility that would be operating at full scale by 2010 — at the repository site. Operation by this date would largely eliminate the need to store significant amounts of spent fuel at reactors after they are shut down.

  The Board also recommends developing storage incrementally by limiting the amount that can be transported to Yucca Mountain until the repository has been licensed for construction. This will reduce the potential risks associated with linking storage to the earlier milestone of site suitability, rather than waiting until the NRC licenses the construction of the repository as required by existing law.

  The Board suggests planning now for a limited-capacity backup facility, similar to the one previously authorized by the Nuclear Waste Policy Act, for emergency storage to be located at an existing federal nuclear facility. The backup facility should begin only if a clear need for the facility is established. Its operation should be phased out once operation of a storage facility at the repository site commences.

The process of planning, licensing and developing a large federal centralized storage facility and the transportation infrastructure that goes with it will take time; estimates range from five to seven years. Even if passed into law now, none of the proposals before Congress would enable operation of a centralized storage facility to begin much before 2002 — and then not at full scale. With the spent fuel stockpile currently at 32,000 metric tons and growing at 2,000 metric tons per year, it will take as long as 30 years to empty the inventory at all the individual reactor sites. So, developing a centralized storage facility at Yucca Mountain now would only reduce, but not eliminate, the need to continue adding spent fuel storage capacity at reactor sites. The Board's suggested approach differs from currently proposed strategies only by the time it will take to determine site suitability — at most five years.

With respect to storage, 2010 is the key milestone. Being able to accept small amounts of spent fuel in 1998 or 2002 will address the storage concerns of only a few utilities. Being able to accept 3,000 metric tons per year for 30 years by 2010 will be necessary to avoid having substantial amounts of spent fuel sitting at shutdown reactors.

Given current funding projections, it appears that the Nuclear Waste Fund will be only marginally capable, at best, of supporting the long-term development and operation of a repository for the permanent disposal of spent fuel. Therefore, the costs of a limited federal storage facility could be recovered through a new fee assessed on the users of that facility. The costs of a large storage facility located at a repository site (which would be used for all spent fuel) could be recovered by increasing the current 1 mill-per-kwh fee going into the Nuclear Waste Fund. This would avoid having future taxpayers bear the costs of final closure of the repository.

These Board recommendations represent a departure from existing policies. The Nuclear Waste Policy Act currently links development of a storage facility to the construction of a repository. The Board recommends that development of a storage facility at Yucca Mountain be linked to the earlier decision about the suitability of the Yucca Mountain site as defined above.

This new approach is not free of risk. Given the inherent difficulties associated with proving safe repository performance over many thousands of years, a site-suitability decision would not be an iron-clad guarantee that the site could be developed as a repository. However, the Board believes that the risks of linking storage to a site-suitability decision, rather than to the NRC licensing decision, can be reduced if the DOE clearly delineates its site-characterization program and focuses on the timely completion of the needed scientific design and assessment activities *and* if it continues to work closely with the oversight groups (e.g., the NRC) that have been involved thus far with the program. Working closely with these groups can help ensure that the decision about the suitability of Yucca Mountain for repository development is technically sound.

Finally, successful development of a system for managing the nation's spent fuel and high-level waste will require sound program management and sufficient and consistent funding. Without adequate funding for *both* disposal *and* storage, a significant amount of spent fuel will remain in storage at reactor sites well after large numbers of reactors begin shutting down in 2010.

Summary of Board recommendations

After evaluating various technical and policy-related considerations regarding federal centralized storage, the Board believes that it is possible to find the right balance between permanent disposal and temporary storage of commercial spent nuclear fuel.

1. Developing a permanent disposal capability should remain the primary national goal and, for the next several years, determining the suitability of the Yucca Mountain site should remain the primary objective of the DOE's waste management program. Assigning the Office of Civilian Radioactive Waste Management any significant new activities at this time could compete for funding and other resources with site-characterization and repository development efforts at the Yucca Mountain site.

2. The Board recommends that during the next several years *generic* planning for a centralized storage facility and for a supporting transportation infrastructure begin at a funding level modest enough to avoid competition with the repository program. From a technical, operational, and fiscal perspective, 2010 is the key milestone for storage. Therefore, plans should be made to have this storage facility operating at full capacity (able to accept 3,000 metric tons/year for 30 years) by about 2010. This will allow the federal government to remove the backlog of spent fuel from those plants already shut down and to empty the pools at other plants as shutdowns occur.

3. The *construction* of a federal centralized storage facility should be deferred until after a decision has been made about the suitability of the Yucca Mountain site for repository development. If Yucca Mountain proves suitable, the centralized storage facility should be located there.

4. The Board recommends developing storage *incrementally* by limiting the amount that can be transported to Yucca Mountain until repository construction has been authorized by the NRC. This will address the potential risks associated with linking storage to the earlier milestone of site suitability. .

5. The Board also recommends reauthorizing limited-capacity backup storage, similar to the one previously authorized by the Nuclear Waste Policy Act, at an existing federal nuclear facility. *Actual development* of the backup facility should begin only if a clear need for the facility is established. Its operation should be phased out once the operation of a large centralized storage facility commences.

6. Because siting a centralized storage facility may be extremely difficult without a viable disposal program, if the site at Yucca Mountain proves unacceptable for repository development, the Board recommends that other potential sites for *both* disposal and centralized storage be considered.

UNITED STATES
NUCLEAR WASTE TECHNICAL REVIEW BOARD
1100 Wilson Boulevard, Suite 910
Arlington, VA 22209

December 13, 1995

The Honorable Hazel O'Leary
Secretary of Energy
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Dear Secretary O'Leary:

At the Nuclear Waste Technical Review Board's October 1995 meeting, the DOE's Office of Civilian Radioactive Waste Management (OCRWM) reported on some important progress recently made in its Yucca Mountain site-characterization and repository development program. In accordance with our legislative responsibilities, we would like to bring this encouraging news to your attention. As you know, the OCRWM's program has received significant criticism — some warranted, some not — since its inception. Indeed, our Board has made many suggestions for its improvement. Recently, substantial funds were cut from the program's budget while the agenda was expanded conditionally to include the storage of commercial spent fuel.

Specifically, as discussed in the enclosed letter to OCRWM Director, Dr. Daniel Dreyfus, the Board was very pleased to hear about progress in excavating underground at Yucca Mountain; the tunnel boring machine is now advancing at very close to commercial rates. It has reached the level of the proposed repository, and the program is acquiring important data about the suitability of the site. Several of our members and staff returned recently from examining the tunnel. So far, the rock at the repository level looks very good, and no significant water has been found at the repository level. The Board also was very pleased to see recent progress in the development of the waste isolation strategy, which is becoming increasingly well defined and coherent. In combination with recent advances in performance assessment, this strategy should enable the OCRWM to undertake an aggressive delineation of program priorities and allocate available funds more efficiently among the various activities of the groups of scientists and engineers working at Yucca Mountain.

The Board is very encouraged about these developments and believes that real progress has been and continues to be made by the OCRWM both in the conduct and in the management of its investigations of the Yucca Mountain site. In the Board's

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judgment, the timely completion of these activities is critical to the future success of the DOE's entire high-level radioactive waste management program.

Thank you for your consideration.

Sincerely,

John E. Cantlon

John E. Cantlon
Chairman

Enclosure

The Honorable Pete V. Domenici
Chairman
Subcommittee on Energy and Water Development
Committee on Appropriations
United States Senate
Washington, DC 20510-6030

Senator Frank H. Murkowski
Chairman
Committee on Energy and Natural Resources
United States Senate
Washington, DC 20510-0202

Representative John Myers
Chairman
Subcommittee on Energy and Water Development
Committee on Appropriations
House of Representatives
Washington, DC 20515-6020

Representative Thomas J. Bliley, Jr.
Chairman, Committee on Commerce
House of Representatives
Rayburn House Office Building
Washington, DC 20515-4607

Representative Dan Schaefer
Chairman, Commerce Subcommittee on Energy and Power
House of Representatives
Washington, DC 20515-0527

The Honorable Hazel O'Leary
Secretary of Energy
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Senator J. Bennett Johnston
Ranking Minority Member
Subcommittee on Energy and Water Development
Committee on Appropriations
United States Senate
Washington, DC 20510-1802

Senator J. Bennett Johnston
Ranking Minority Member
Committee on Energy and Natural Resources
United States Senate
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Representative Tom Bevill
Ranking Member
Subcommittee on Energy and Water Development
Committee on Appropriations
House of Representatives
Washington, DC 20515-6020

Representative John Dingell
Ranking Minority Member
Committee on Commerce
House of Representatives
Washington, DC 20515-2216

Representative Frank J. Pallone, Jr.
Ranking Member
Chairman, Commerce Subcommittee on Energy and Power
House of Representatives
Washington, DC 20515-3006

cc: Dr. Daniel A. Dreyfus, Director
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

UNITED STATES
NUCLEAR WASTE TECHNICAL REVIEW BOARD
1100 Wilson Boulevard, Suite 910
Arlington, VA 22209

February 23, 1996

The Honorable Hazel O'Leary
Secretary of Energy
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Dear Secretary O'Leary:

During this past year, it has become increasingly clear that the Department of Energy's (DOE) Civilian Radioactive Waste Management Program is approaching a critical crossroads. The authorizing and appropriating committees of the Congress have signalled what may prove to be a change in program focus from *permanent* disposal of commercial spent fuel in an underground repository to *temporary* surface storage. The Nuclear Waste Technical Review Board, which has been evaluating this DOE program for Congress since 1989, is concerned about this possible change in focus — especially given the significant recent progress in the DOE's site-characterization and repository development activities. In accordance with the Board's legislative mandate to report to the Congress and the Secretary of Energy on this program, the Board would like to bring its concerns to your attention. Specifically, this letter addresses (1) the extent of recent progress at Yucca Mountain, Nevada, (2) the continuing need to keep the primary focus of the federal government's current waste management efforts on permanent disposal, and (3) the implications of further fluctuations in program funding.

The DOE has made significant recent progress at Yucca Mountain

Significant progress has been made in a number of areas at Yucca Mountain during this past year. The DOE has greatly increased the efficiency of the underground tunneling operation at the site; the main tunnel is now more than 2.5 miles long and is exploring at the proposed repository level. The DOE is obtaining data about the character and hydrology of the underground rock where waste eventually could be placed. In addition, a clear and technically defensible waste isolation strategy is beginning to emerge. This strategy will help explain how the natural and engineered barriers at the site should work together to isolate radioactive waste from the environment. Together with recent advances in repository performance assessment, the strategy will enable the DOE to set priorities among exploration and testing activities to achieve a better understanding of the hydrology and other characteristics of the site — in less time and at less cost. Finally, current management is continuing to improve program focus and effectiveness. The Board believes that if the DOE can maintain the recent pace of underground exploration, testing, and analysis, sufficient information should be

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available to determine within five years if the site at Yucca Mountain is suitable[1] for repository construction.

Based on the data gathered and the analyses completed so far, the Board has seen nothing that would indicate that the Yucca Mountain site is unsuitable from a technical standpoint for repository development. However, it will be necessary to complete additional underground exploration and testing activities at Yucca Mountain before the DOE can make a technically sound decision on the suitability of the site. Also, the DOE's application to the NRC for a construction license will require additional confirmatory activities.

Permanent disposal in a geologic repository should remain the nation's primary objective

Several legislative proposals are being considered by Congress that would shift the focus of the DOE's program from permanent disposal to temporary storage. Ironically, this is happening just when previous investments in site characterization and repository development are beginning to pay off.

The Board has spent the past year reviewing the many complicated issues related to the storage and disposal of commercial spent fuel. We will be releasing a report on our findings in March and would very much like to brief you or your staff on our conclusions and recommendations. It is clear from our analysis that spent fuel (and defense high level waste) will ultimately need to be disposed of; temporary storage is not a substitute for disposal. Nevertheless, the Board has concluded that a large federal storage facility will be needed in the future, especially around 2010 when reactors will begin shutting down in large numbers. It also is clear that the technical, operational, and fiscal advantages of having such a storage facility increase if the facility is located at an operating repository site.

There is no compelling technical or safety reason, however, to move spent fuel to a centralized storage facility in the next few years. Moreover, the Board believes that adding a major storage component to the DOE's present responsibilities — in today's constrained funding environment — could create such competition for funding and other resources that the nation's commitment to developing a permanent geologic repository could be seriously eroded. Results of past efforts to develop centralized storage suggest that, without the credible prospect of disposal, it may prove very difficult to site and develop any new storage capacity. Opposition in the past to storage facilities has centered on the concern that once sited, a facility could become a de facto surface disposal site. The lack of a disposal capability also raises serious questions about the fate of the government-owned spent fuel and high-level defense wastes that currently are being stored — sometimes under less-than-optimum conditions — at defense sites around the country.

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[1] *By suitable we mean that there is a high probability that the site, along with the appropriate engineered barriers, can provide long-term waste isolation.*

The Board recommends that, for the next several years, the DOE's Civilian Radioactive Waste Management Program focus its efforts on making a timely decision on the suitability of the Yucca Mountain site for repository development. In the meantime, reauthorizing a small, limited-capacity backup storage facility, similar to the one previously authorized by the Nuclear Waste Policy Act, may be one way to accommodate the storage needs of any utilities that, for one reason or another, cannot continue to store their own spent fuel.

Consistent program funding will be necessary

In March 1993, the Board's *Special Report to Congress and the Secretary of Energy* concluded that the program was allocating a high proportion of funds to overhead and infrastructure costs, thus limiting funding for important testing, research, design, and underground excavation. Current program management has succeeded in part in addressing this problem. However, further fluctuations in program funding of the magnitude currently being experienced will make it very difficult to retain key technical and management personnel or to maintain the current pace of program activities. The Board believes that sufficient and consistent long-term funding will be necessary to sustain current program momentum so that a site-suitability determination at Yucca Mountain can be made within the next few years.

In summary, the Board reiterates its belief that the nation ultimately will need *both* a credible repository development program *and* a plan to address future spent fuel storage needs. For the next several years, however, the primary focus should remain on developing a credible disposal capability. This is the best way to achieve safe, permanent disposal of all of the country's spent nuclear fuel and high-level waste and to allay concerns that existing temporary storage facilities will become permanent. For the next few years, the DOE should focus on making a technically defensible decision on the suitability of the Yucca Mountain site for repository development. To address future storage needs, the Congress could authorize the DOE to begin *generic* planning now for a large federal storage facility and supporting transportation infrastructure at a funding level modest enough to avoid competition with the repository program. Plans should ensure that this facility is operating at full scale by 2010 — ideally at a repository site. Also, a small, emergency backup storage capability at an existing federal nuclear site may be necessary. Finally, the Board recommends that Congress provide sufficient and consistent funding for the next several years to help ensure the success of this critical national program.

Sincerely,

John E. Cantlon

John E. Cantlon
Chairman

The Honorable Pete V. Domenici
Chairman
Subcommittee on Energy and Water Development
Committee on Appropriations
United States Senate
Washington, DC 20510-6030

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Committee on Appropriations
House of Representatives
Washington, DC 20515-6020

Representative Tom Bevill
Ranking Member
Subcommittee on Energy and Water Development
Committee on Appropriations
House of Representatives
Washington, DC 20515-6020

Representative Thomas J. Bliley, Jr.
Chairman, Committee on Commerce
House of Representatives
Rayburn House Office Building
Washington, DC 20515-4607

Representative John Dingell
Ranking Minority Member
Committee on Commerce
House of Representatives
Washington, DC 20515-2216

Representative Dan Schaefer
Chairman, Commerce Subcommittee on Energy and Power
House of Representatives
Washington, DC 20515-0527

Representative Frank J. Pallone, Jr.
Ranking Member
Chairman, Commerce Subcommittee on Energy and Power
House of Representatives
Washington, DC 20515-3006

The Honorable Hazel O'Leary
Secretary of Energy
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

cc: Dr. Daniel A. Dreyfus, Director
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

UNITED STATES
NUCLEAR WASTE TECHNICAL REVIEW BOARD
1100 Wilson Boulevard, Suite 910
Arlington, VA 22209

December 6, 1994

Dr. Daniel A. Dreyfus, Director
Office of Civilian Radioactive
  Waste Management
U.S. Department of Energy
Washington, DC 20585

Dear Dr. Dreyfus:

During the past six months, the Nuclear Waste Technical Review Board has met on several occasions with representatives of the Department of Energy (DOE) to gain a better understanding of your new program approach to developing and licensing the nation's first spent fuel and high-level waste repository. Ideally, one should be able to discern in the program a direct linkage among a waste isolation strategy, key decisions, technical activities, budgets, and schedules. Although the program has not yet reached this level of integration, the Board is encouraged that the program seems to be moving in this direction. It is in this spirit that we offer our comments on the evolving civilian radioactive waste management program.

The Board understands that many details of the program approach have yet to be worked out; however, we have some concerns that we believe should be brought to your immediate attention. The points listed briefly below are discussed in more detail in the enclosed document.

- A clearer definition of "technical site suitability" is needed now to establish a sound basis for future program efforts.

- The DOE should continue to develop a waste isolation strategy to provide an improved technical basis for deciding which site-characterization tests will be completed, deferred, or deleted.

- Perhaps the single most important goal in characterizing the site is predicting (or placing bounds on) the amount and significance of water that could reach the repository, corrode waste packages, and transport radionuclides to the environment.

- The effects of waste heat on repository performance must be understood well enough to permit confident predictions of (or bounds on) repository performance for alternative thermal loadings.

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- A few alternatives for the thermal loading of a Yucca Mountain repository should be carried forward until a better technical basis has been developed for choosing a preferred loading.

- The Board believes that substantially more underground excavation will be needed for a technical site-suitability decision than currently is planned.

The enclosed document also summarizes the site studies and other activities that the Board believes are most important for reducing current uncertainties about the suitability of the Yucca Mountain site.

In closing, let me emphasize that the Board views the new program approach as an excellent opportunity to streamline the scope of site-characterization activities and to improve the technical bases for program decisions. However, completing the necessary site studies and repository design efforts within the current schedule will be a significant technical and managerial challenge, especially considering the need for external reviews by and coordination with the Nuclear Regulatory Commission, the National Academy of Sciences, and other groups. The Board looks forward to continued interaction as the program evolves.

Sincerely,

John E. Cantlon
Chairman

Enclosure:
Recommendations for
Evaluating Site Suitability

Recommendations for Evaluating Site Suitability

Two recent meetings of the Nuclear Waste Technical Review Board, in October and November 1994, focused on the U.S. Department of Energy's (DOE) plans for evaluating the suitability of the Yucca Mountain candidate repository site and the technical studies (especially thermal testing) to be conducted at the site. As a result of those meetings, the Board has reached three conclusions that require your attention. These conclusions are discussed in the following paragraphs. The Board then identifies the areas of technical uncertainty that it believes are most important for evaluating the suitability of the Yucca Mountain site. Finally, this document offers some general recommendations for exploration, testing, and analytical activities needed to produce a technically defensible evaluation of the suitability of the Yucca Mountain site, as well as some areas where current efforts could be reduced.

The Board is unable to say that these activities are absolute requirements, nor can the Board guarantee that these activities will prove sufficient. In fact, revisions to plans for site characterization will be inevitable as information from the exploratory studies facility and other surface-based and laboratory activities is collected and evaluated. However, based on today's knowledge of the site, on the anticipated legal and regulatory requirements for further repository development, and on the current uncertainties about the specifics of the DOE's waste isolation strategy, the Board believes that the activities identified in this document represent a prudent suite of studies for evaluating technical site suitability.

Conclusions from our recent meetings.

1. A clearer definition of "technical site suitability" is needed. The DOE needs to identify the technical requirements for its technical site-suitability decision and the additional requirements for the licensing stage of repository development. Clear definitions of "technical site suitability" and other program goals are very important if the DOE is to develop a streamlined program of site-characterization activities that will produce all necessary technical information within existing budget and schedule constraints. A clear definition of technical site suitability is also important because the DOE's site recommendation decision will presumably initiate a politically important and potentially controversial sequence of activities that may include a Presidential recommendation to develop a repository at the site, a state veto of that recommendation, and a congressional override of the state's veto. Uncertainty about what the DOE means if it declares the site "technically suitable" may adversely affect the nation's efforts to move forward with repository development.

2. Development of a waste isolation strategy should continue. The Board was pleased to learn that a waste isolation strategy, or waste disposal concept, is beginning to emerge within the DOE's program. The waste isolation strategy should identify and quantify the roles of the repository features and/or barriers that will provide waste isolation, and should be based on the defense-in-depth philosophy that has long been a fundamental aspect of repository planning. The strategy can then provide one of the major bases for planning and prioritizing tests. However, two important parts of the strategy are still needed: (1) a decision on the extent to which engineered barrier system features outside the waste packages will be used and (2) a definition and quantification of the features and functions of the geosphere that can serve as essential natural barriers to release of waste. The strategy presented to the Board by J. Younker needs to be clarified and expanded.

Ideally, one should be able to discern in the program a direct linkage among a waste isolation strategy, key decisions, technical activities, budgets, and schedules. The waste isolation strategy is particularly important because it can provide a more technically defensible basis for deciding which site-characterization studies will be completed, deferred, or deleted. For example, one of the more important decisions that requires an improved technical rationale is the sharply reduced scope of surface-based drilling to be completed before the technical site-suitability decision. Results of total system performance assessments, in conjunction with a clearly articulated waste isolation strategy, should be used to determine the amount of surface-based drilling that is needed. Prioritization of other site studies should similarly be linked to the waste isolation strategy through performance assessments.

3. A few thermal management alternatives should be carried forward. The DOE has made a tentative decision to seek an initial license for a Yucca Mountain repository based on a low thermal-loading design, while retaining the option to amend the license at a later time to increase the thermal loading. The basis for this decision is the expectation that it will be easier to obtain regulatory approval for designs with lower thermal loadings. There is no clearly articulated or documented technical basis for this decision. The DOE needs to more clearly define its concept of a "low" thermal-loading design and needs to document the technical rationale for its selection.

The technical information and analyses currently available are inadequate to select a preferred thermal-loading strategy. Therefore, the Board recommends that the DOE preserve the option to further develop a few alternative thermal-loading strategies, such as the extended-dry concept, the base case in the site-characterization plan, and a below-boiling design. Preserving these alternatives may be the only practical way for the DOE to reach technically defensible decisions within the program's current schedule since the long-term in-situ thermal tests required to select a preferred strategy cannot be completed before the 1998 scheduled date of the technical site-suitability decision, or even by the 2001 target date for the license application for construction authorization. Our concept of preserving thermal management alternatives does *not* require a significant engineering design effort for each. However, the DOE should develop appropriate measures to ensure that decisions regarding design and testing activities will not preclude the adoption of any of the alternative thermal management strategies in the future as better technical information becomes available.

Most important technical uncertainties

One of the most important features of the Yucca Mountain site is the deep water table and the apparently minimal amount of water present in, and moving through, the unsaturated zone. The presumed dryness of the site is a pervasive factor in the DOE's developing waste isolation strategy because the dryness influences the performance of both engineered and natural barriers. Perhaps the single most important goal in characterizing the site is predicting (or placing bounds on) the amount and significance of water that could reach the repository, corrode waste packages, and transport radionuclides to the environment. This determination must include both spatial and temporal variations in hydrologic properties, the influence of fractures, and the potential for processes or events (e.g., climate change) to alter the hydrologic conditions, at least to the extent that waste isolation might be affected.

A second major concern is the effect of heat generated by radioactive waste on repository conditions. Heat can significantly alter hydrologic conditions by vaporizing liquid water and by inducing convective movements of air and water vapor. Heat can also alter rock properties either directly through thermally induced mechanical, chemical, or mineralogical changes or indirectly through interactions with water (e.g., dissolution, transport, and eventual precipitation of dissolved minerals when the temperature changes or when water vaporizes). The kinetics of reactions affecting engineered barrier performance (e.g., waste package corrosion and radionuclide dissolution) are likely to be temperature dependent. It is important that the effects of waste heat on repository performance be understood well enough to permit confident predictions of (or bounds on) repository performance.

The third major area of concern at Yucca Mountain is the extent of fracturing and faulting, and the transmissive properties of fractures and faults, in the repository block and in overlying, underlying, and neighboring strata. If high-permeability faults or fractures represent conduits for the movement of water, especially episodic flow after high-precipitation events at the surface or reflux of water mobilized by radioactive decay heat, highly fractured portions of the repository block may be unsuitable for waste emplacement. If faults are found that are capable of movement following waste emplacement, it might also be necessary to restrict waste emplacement to areas where mechanical damage to waste packages is less likely. A moderate amount of fracturing or faulting may not be a cause for concern. In fact, under certain conditions, faults or fractures could serve as "drains" to channel water away from waste packages. However, if the repository contains extensive faults and fracture systems with hydrologic significance, there may be so little useable waste emplacement area that the site might be judged unsuitable. Underground exploration, characterization, and testing in the repository block must be sufficiently extensive to determine whether there will be adequate emplacement space for the projected inventory of waste, given the thermal-loading strategy ultimately adopted for the repository.

Specific recommendations

Based on current knowledge of the major features of the Yucca Mountain site, the Board recommends the following as the minimum suite of site-characterization studies needed to produce a technically defensible evaluation of the suitability of the site. It is important to emphasize, however, that the following paragraphs are not intended to be a comprehensive study plan for characterizing the Yucca Mountain site. Additional studies may be needed to produce information for licensing or to provide greater confidence that the site can be shown to be suitable. Changes to planned studies also may be warranted as site information from surface-based testing and underground exploration is acquired and its significance evaluated through the iterative performance assessment process.

Hydrogeologic & geochemical tests. Hydrologic studies to support the technical site-suitability decision should emphasize identification of potential fast flow paths, the significance of those fast paths for waste isolation, and the significance of perched water within the unsaturated zone. The DOE's planned studies of hydrologic and geochemical conditions, including moisture content, composition, and age-dating for water in the rock matrix and in fractures, seem generally appropriate. However, more emphasis on isotopic studies is needed because age-dating of ground waters through those studies provides the most valuable information available about potential fast flow paths and pneumatic pathways. More schedule flexibility also may be needed to permit completion of an adequate scope of tests. The DOE recognizes that more extensive studies of the radionuclide dilution potential of the saturated zone may be needed to evaluate compliance with a dose-based standard for repository performance, if such a standard should be developed by the U.S. Environmental Protection Agency. The Board recommends that the scope of planned studies be reviewed as the form of the repository performance standard becomes clearer.

Thermal testing. The DOE presently plans two sets of in-situ thermal studies — relatively short-term, accelerated tests to provide early information to support an application for construction authorization in 2001 and longer-term tests to provide information needed to apply for a license to receive and possess waste in 2008. The planned 1998 technical site-suitability decision will be based on information from early G-tunnel studies and from later laboratory and, if available, large-block heater tests. As now planned, preliminary results of the accelerated in-situ heater tests may be available in 2000 to support a recommendation of the Yucca Mountain site for repository development.

Ideally, several years of in-situ thermal test data should be available to support a technical site-suitability evaluation. The Board recognizes that the data available to the DOE at the time it plans to make a technical site-suitability decision are not likely to include in-situ thermal testing results. However, it is possible that the more limited data to be produced by the DOE's planned large-block heater tests, combined with very preliminary information from accelerated in-situ tests, could be sufficient *if* the DOE were to conduct analyses to identify the thermally induced physical and chemical changes that could cause failure of the repository system *and* could show convincingly that such changes are not credible or can be prevented by appropriate waste package/engineered barrier/repository design. Analyses of the effects of heat on repository performance should be initiated immediately, should continue throughout the site-characterization process, and should be used to identify (or modify) thermal tests to be carried out from site characterization through repository performance confirmation.

Finally, data from the accelerated tests *cannot* be presumed to provide positive confirmation of present theories on thermal effects. Information may prove to be inadequate. Or, test results could diverge significantly from the results of laboratory tests, large-block heater tests, or the conceptual/failure mode studies mentioned above. Under any of these circumstances, it may be necessary to delay the recommendation to the President for repository development until better information from the long-term tests can be obtained.

Underground excavation. The Board believes that substantially more underground excavation will be needed than currently is planned by the DOE. Sufficient underground exploration is needed to confirm at repository depth the continuity and orientation of structures already identified by surface investigations, to identify structures not evident at the surface, and to permit testing of structures and formations to determine their significance for long-term waste isolation. The influence of geologic structures and formations on the hydrologic properties of the repository block is the primary issue of concern. To the extent that faults serve as potentially fast water flow paths or may be capable of movement following waste emplacement, determination of an appropriate offset distance for waste emplacement will be necessary. Specifically, the Board believes that the following excavation is needed for a technical site-suitability determination.

1. As now planned, excavate the north ramp to the repository level and excavate a "main drift" through the center of the repository block in an approximately north-south direction parallel to and just west of the Ghost Dance Fault zone.

2. Explore faults and structures in the central portion of the repository block east of the main drift. The planned intersection of the Ghost Dance Fault at two locations with small diameter drifts is appropriate. An eastern extension of one of these drifts is needed to fully cross the Ghost Dance Fault zone. Further extension of the drift into the Imbricate Fault as far as the eastern boundary of the block may be needed unless adequate information about the Imbricate Fault can be obtained from the north ramp.

3. Explore faults and structures in the repository block to the west of the main drift, particularly in the area of fracturing and suspected faulting identified by Scott and Bonk. Most of the proposed repository area is located to the west of the main drift, and at least one tunnel is needed in the area of suspected faulting extending west to the Solitario Canyon Fault to evaluate the suitability of that portion of the repository horizon.

4. Excavate a thermal test area in a suitable zone of the Topopah Springs formation at or near the repository block. For the best understanding of the effects of heating on mechanical and hydraulic conditions near the excavated surface, machine excavation of the test area is needed.

5. Excavate into the Calico Hills formation from a portal separate from the existing north portal. This excavation should cross the Ghost Dance Fault zone at least once at a location immediately below one of the crossings at the Topopah Spring level.

It is unclear whether the DOE is developing a thorough waste isolation strategy that includes reliance on the Calico Hills formation as a barrier to release of waste. However, because the Calico Hills may be one of the most effective geologic barriers at the Yucca Mountain site, the Board believes that exploration into the Calico Hills formation (and incorporation of the Calico Hills as a possible barrier in the waste isolation strategy) would be prudent. Exploration in the Calico Hills may help to resolve hydrologic and structural geologic uncertainties that cannot be studied adequately using only surface-based testing.

Completion of this tunneling within the DOE's announced schedules may require (1) more aggressive schedules for operating the current tunnel boring machine than the present planning suggests, (2) simultaneous excavations with additional smaller machines, (3) contracting for large sections of tunnel rather than buying more equipment, and (4) faster and more economical acquisition of equipment for small-scale excavation of alcoves (e.g., by lease by contractors rather than purchase by the DOE). In addition, we have recommended before the establishment and use of a geotechnical engineering board by the DOE. We continue to believe that such a board would help the DOE more quickly resolve the problems that inevitably occur during major underground construction projects.

Depending on the waste isolation and thermal-loading strategies chosen and on the results of initial tunneling, additional underground exploration may be required. For example, if the DOE's repository design is based on a low thermal-loading strategy that requires use of "expansion areas" outside the existing repository block, exploration of those areas also will be required. Plans for additional exploration should be developed now so that those excavations can be carried out quickly if they become necessary.

Source term. A realistic representation of the source term — the release of radionuclides from the engineered barrier system — must be developed for a range of alternative thermal loadings. For example, for the unsaturated conditions expected at Yucca Mountain, data are needed on the effects of temperature on radionuclide solubilities and retardation factors, on the applicability of retardation factors obtained from batch tests, and on the importance of colloid mobility. Also, for the large, drift-emplaced waste package, those portions of the engineered barrier system outside of the waste package have been essentially ignored. Concepts such as the use of backfill or waste package fillers to modify the thermal, chemical, or hydrological environment or the use of capillary barriers should be evaluated.

Additional studies. Although not of the highest priority in terms of timing, additional studies are needed for a technically defensible site-suitability decision. Some of these include:

1. Studies of disruptive processes and events (especially volcanism) are needed to evaluate compliance with the siting guidelines and to support the probability estimates required by a total system performance assessment.

2. Ongoing detailed surface mapping of faults should be completed and the potential for displacement on faults found within and near the repository block should be determined. As appropriate, this information should be used to help guide underground excavation to the areas of most importance for waste isolation.

3. At least three years of long-term corrosion research, under conditions relevant to design of waste packages and engineered barriers, should be completed prior to the technical site-suitability determination. The Board believes that approximately 10 years of corrosion research will be necessary to support a licensing decision to permit repository operations. The waste isolation capabilities of engineered barriers other than the waste package (e.g., capillary barriers) should also be evaluated to support a license application.

4. Expert judgment will be especially important in many areas such as identifying conservative bounding assumptions that are an important part of the DOE's planned site-suitability evaluation. Procedures for eliciting and using expert judgment should be defined, fully analyzed, and shown to be acceptable for licensing.

5. A method needs to be defined for dealing with conceptual model uncertainty, such as a weighted combination of available models or use of bounding analyses.

6. Since an environmental impact statement will be required to make a site recommendation, studies should be completed to support its preparation including measurements of soil moisture uptake by desert plants for at least two years under a variety of seasonal, soil, and other conditions; examination of shrub cover along areas of faulting to help determine the role of fracture-rooted plants in evapotranspiration where soils are thin and underlying rocks are fractured; and completion of at least two years of study of the ecosystem response to soil and fractured rock heating.

7. To establish a better understanding of the steep hydrological gradient to the north of the proposed repository site and to evaluate its potential to affect water table depths under the repository, at least one more suitably located deep well will be needed.

Areas where emphasis can be reduced

As the DOE's waste isolation strategy becomes more fully developed, it should be possible to identify areas of on-going study that can be assigned a lower priority or eliminated entirely. Candidate areas that might be considered for a lower priority now include the following.

1. Earthquake shaking should *not* be an issue for evaluating the technical suitability of the site since the repository and its critical structures can readily be designed to withstand any design seismic loading that is likely to be specified for the site. In the Board's view, designing for shaking is well within current engineering capabilities.

2. New studies of volcanic rock dates are not likely to change probability estimates for volcanism.

3. For the technical site-suitability evaluation, it should *not* be necessary to measure the in-situ thermomechanical response of rocks in the range of temperatures associated with the thermal-loading strategies under consideration by the DOE. Conservative assumptions for designing a repository will adequately compensate for uncertainties caused by lack of geomechanical testing in the thermal test area. However, thermomechanical effects on rock stability are important considerations in repository design. For repository licensing such measurements should, as much as possible, be integrated into the thermohydrological tests.

The Board does not believe that a complete understanding of Yucca Mountain is possible or necessary for licensing a safe geologic repository. What is required is an understanding that is sufficient to confidently demonstrate that waste disposal at the site will be safe. The Board urges the DOE to develop a clearer waste isolation strategy as soon as feasible and, consistent with that strategy, to aggressively seek opportunities to further streamline and prioritize its planned site-characterization studies.

UNITED STATES
NUCLEAR WASTE TECHNICAL REVIEW BOARD
1100 Wilson Boulevard, Suite 910
Arlington, VA 22209

December 13, 1995

Dr. Daniel A. Dreyfus
Director
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
1000 Independence Avenue, SW
RW-2/5A-085
Washington, DC 20585

Dear Dr. Dreyfus:

Thank you for participating in the Nuclear Waste Technical Review Board's October meeting in Arlington, Virginia. The Board found this meeting to be extremely interesting and informative. The Board is impressed with the progress the Office of Civilian Radioactive Waste Management (OCRWM) has made both in analytic studies and in its underground exploration at Yucca Mountain. The information provided during the course of the two days stimulated a great deal of discussion among Board members during and after the meeting. The Board would like to take this opportunity to provide you with some preliminary feedback from the meeting and our discussions.

It appears that significant progress is being made in developing a clearly defined and coherent waste isolation strategy. As you know, the Board believes that this kind of strategy is needed to help establish and maintain program priorities. Now that program funding is being reduced, having such a strategy is more important than ever. Some critical assumptions underlying the draft waste isolation strategy do require further examination, especially the amount and character of future percolation flux, the duration of low relative humidity in the vicinity of the waste package, and the amount and duration of dilution in the saturated zone. Once completed, the results may dictate further modification of the strategy and of the program's priorities and study plans.

The latest round of total system performance assessment (TSPA-95) represents a major improvement over its 1993 iteration. The increased level of detail in modeling the near-field thermo-hydrological environment, waste package degradation, engineered barriers, and other aspects of repository performance provides new insights that should enable the OCRWM to decide what activities to emphasize during the coming months. The TSPA-95 also should be useful when explaining repository development issues and activities to stakeholder groups. The Board hopes the OCRWM uses the TSPA-95 aggressively to focus scarce resources on those activities that are of the highest priority.

The Board has long believed that engineered barriers are an important component of a multi-barrier repository system. The Board is pleased to see that

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engineered barriers are playing a more significant role in the draft waste isolation strategy and that TSPA-95 included preliminary evaluations of the performance of some potential engineered barriers, including backfill, cathodic protection of waste packages, and capillary (flow diversion) barriers. The Board generally believes that the longer the waste can be contained, or significant releases delayed, the better. Waste packages can probably be designed to provide thousands of years of containment; other engineered and natural barriers may add several thousand to hundreds of thousands of years of delay at a suitable repository site. Therefore, the DOE should encourage innovative thinking in the design and possible use of other engineered barriers, such as suitable waste package fillers.

The Board is pleased to hear that the performance of the tunnel boring machine (TBM) continues to improve, primarily due to favorable geology, a more realistic definition of what constitutes safe tunnel support, increased crew experience, and improved management. The TBM is now well into the proposed repository horizon, and, with continuing favorable geology and effective use of the board of expert consultants, TBM operations should continue at what are close to commercial rates. Underground excavation has already revealed features — some anticipated, others not — that contribute to our understanding of the Yucca Mountain geology. This level of understanding could not have been determined from surface-based investigations alone. The Board continues to believe that more underground exploration of the repository block is needed.

The Board recognizes that these are times of great apprehension for the program. Reduced funding and temporarily uncertain regulatory criteria dictate that the DOE carefully evaluate ongoing and proposed site-characterization activities at Yucca Mountain. The program must remain flexible yet focus on those activities that can be identified now as being high priority; contingency plans should be developed to address those activities that await regulatory clarification and congressional action. Finally, the program must continue to improve its organizational and managerial efficiency to carry out all of the above in a timely manner, thus strengthening the confidence of Congress and the stakeholders.

Once again, thank you for supporting an excellent meeting.

Sincerely,

John E. Cantlon

John E. Cantlon
Chairman

Fiscal Year 1997
Congressional Budget Request

Dr. John E. Canton, *Chairman*
U. S. NUCLEAR WASTE TECHNICAL REVIEW BOARD

March 1996

ADDITIONAL DETAILS
Fiscal Year 1997
Congressional Budget Request

U.S. NUCLEAR WASTE TECHNICAL REVIEW BOARD

For fiscal year 1997, the Board is requesting $3,214,000 in new budget authority. This amount will meet the Board's *total* funding requirement for fiscal year 1997 and *will establish a viable baseline for out-year funding, which the Board does not now have.*

Historically, Board funding has been satisfied by a combination of appropriated new budget authority and carryover funds from prior years that resulted primarily from unfilled Board member and staff positions. Until now, each budget year, the Board has requested only that new budget authority (appropriation), which, when supplemented by unobligated balances (carryover), was necessary to meet its funding needs. For example, in fiscal year 1996, the Board's total funding was $3,169,000 ($2,531,000 in new budget authority). However, because the Board is now fully staffed, for fiscal year 1997, instead of using the unobligated balance from fiscal year 1996 (approximately $448,000) to supplement its request, the Board is requesting its *total* funding requirement of $3,214,000 in new budget authority. *This will establish a viable baseline for the Board's out-year funding.* If the out-year funding baseline were similar to the appropriations of new budget authority in fiscal years 1995 ($2,664,000) and 1996 ($2,531,000), both of which were supplemented by carryover funds, the Board would fall considerably short of the amount needed to meet its anticipated oversight responsibilities.

The Board's fiscal year 1997 budget request assumes a full 11-member Board operating with a targeted staffing level of 20 (a 10 percent reduction from FY 1996).

The guiding objectives underlying this budget request are to:

- support the efforts of the Board members who are heavily involved in a congressionally mandated review of the Department of Energy's technical and scientific activities related to the safe management of commercial and defense high-level radioactive wastes;
- maintain a small (reduced 10%) professional and support staff of the highest caliber commensurate with the status, abilities, and responsibilities of the congressionally established and Presidentially appointed Board, which it supports; and
- provide the opportunities, tools, and resources for the Board and staff to effectively pursue the mission with which the Congress has charged the Board in the Nuclear Waste Policy Act.

DETAILS

A detailed breakdown and justification of this request by object class follows.

Object Class 11.1 - Full-time staff - $1,438,000

The amount requested for full-time permanent staff represents the requirement to fund 20 positions—10% reduction from fiscal year 1996. Because the majority of the Board's technical and scientific evaluations are conducted by Board members themselves, the Board's enabling legislation provides that the Chairman may appoint and fix the compensation of not more than 10 professional staff members.

Also, the Chairman is authorized to appoint such clerical staff as may be necessary to discharge the responsibilities of the Board. The remaining ten positions are support staff engaged in clerical, secretarial, administrative, publications, public affairs, and meeting logistics for the Board. Two administrative support staff positions have been eliminated in response to Appropriations Committee comments that it believed the ratio of clerical to professional staff was excessive.

This estimate for staff salaries assumes a 3.0 percent combined COLA and locality raise in January 1997, an average 1.5 percent merit increase for professional staff, and a 1.5 percent increase for promotions and step increases for support staff. For 1996, the professional staff received a merit increase of approximately 3 percent but did *not* receive the combined COLA and locality increase of 2.54 percent.

Object Class 11.3 - Other than full-time permanent staff - $475,000

The amount requested in this category represents compensation to Board members and compensation for occasional employment of experts and consultants.

Each member of the Board will be compensated at the rate of pay for level III of the Executive Schedule for each day the member is engaged in work for the Board. It is estimated that during the year, each Board member will attend four full Board meetings, two panel meetings, and four other meetings or field trips. This estimate represents 64 workdays for each member during fiscal year 1997. Furthermore, it is expected that the Chairman will spend 100 days carrying out the prior noted responsibilities and other Board business. This estimate assumes a 1.5 percent COLA in January 1997.

Also included in this object class are an estimated 277 consultant days required to support the Board, its panels, and the professional staff. These consultants will be hired under the authority provided by the Board's enabling legislation, which permits the Board to pay such experts and consultants up to the daily rate of level IV of the Executive Schedule.

Object Class 11.5 - Other personnel compensation - $31,000

The amount provided in this area covers approximately 150 hours of staff overtime and performance awards under the OPM-approved Performance Management System. Most board and panel meetings require substantial overtime to handle preparation and on-site meeting logistics.

Object Class 11.8 - Special personal services payments - $6,000

The amount requested will support reimbursable details from other government agencies.

Object Class 12.1 - Civilian personnel benefits - $319,000

The estimate in this category represents the government's contribution for employee benefits at the rate of 19.5 percent for staff (a mid-range estimate between CSRS and FERS employees) and 7.65 percent for members and consultants hired as special government employees.

Object Class 21.0 - Travel - $303,000

The amount requested for this object class includes travel costs for Board members, staff, and consultants to attend Board and panel meetings, other meetings to acquire technical and scientific data (including professional meetings and conferences), and/or site visits to review activities within the scope of the Board's mission. It is expected that members will attend four Board and two panel meetings, and make four other trips during the year with an average length of four days each, including travel time. It is anticipated that each of the ten professional staff members will travel on similar activities an average of ten trips during the year with an average of five days per trip. Finally, consultants, for whom the Board reimburses travel expenses, are estimated to make a total of 24 trips, which include attending some of the Board and panel meetings.

Object Class 23.1 - Rental payments to GSA - $220,000

The estimate for this object class represents the amount the Board will pay to the General Services Administration for office space rental totalling 6,040 sq. ft. at an annual rate of $36.42 per sq. ft. This estimate reflects the congressionally mandated GSA rent reductions. The Board may have to relocate in December 1996 due to the expiration of the lease at the current location.

Object Class 23.3 - Communications, utilities, misc. - $63,000

The requested amount represents estimates for telephones, postage, courier service, local delivery service, FTS - long distance telephone service, and mailing services related to management and use of the Board's mailing list.

Since Board members are located throughout the country, it is important to distribute information to them on a timely basis. Also, intercity delivery service is a critical link in this communication network. Additionally, costs are incurred to ship materials to the many meetings held at locations throughout the country.

Object Class 24.0 - Printing and reproduction - $25,000

The major items in this object class are commercial copier service, the publication of semi-annual and special reports to Congress and the Secretary of Energy, *Federal Register* publication of meeting notices, the production of press releases announcing meetings, and the printing and distribution of a newsletter and other informational materials for Board members and the public.

Object Class 25.1 - Consulting services - $75,000

The Board estimates it will contract with technical consultants to provide expertise currently not available from the members and professional staff.

Object Class 25.2 - Other services - $150,000

The major items in this category include court reporting services for an estimated 15 Board or panel meetings, meeting room rental and related services, maintenance agreements for equipment, computer network software maintenance, and miscellaneous supplies and services from commercial sources. This estimate includes the costs for relocation.

Object Class 25.3 - Services from other government agencies - $52,000

This category includes GSA administrative support services (payroll, accounting, personnel, etc.), audit services from the GSA inspector general, security clearances through the Office of Personnel Management, and other miscellaneous interagency agreements.

Object Class 26.0 - Supplies and materials - $44,000

Anticipated expenses include routine office supplies, subscriptions and library materials, costs for off-the-shelf technical reports and studies, and ADP software.

Object Class 31.0 - Equipment - $14,000

This estimate primarily represents equipment costs to upgrade the telephone and computer systems at the current location, or to prepare for the upgrades at the new location in December 1996.

NUCLEAR WASTE TECHNICAL REVIEW BOARD

Salaries and Expenses
Program and Financing (in thousands of dollars)

Identification code 48-0500-0-1-271		95 ACT	96 EST	97 EST
Program by activities:				
10.00	Total obligations	2,841	3,169	3,214
	Budgetary Resources Available for Obligation			
21.40	Unobligated balance, start of year	1,232	1,086	448
22.00	New Budget Authority	2,664	2,531	3,214
22.10	Prior Year Recoveries	41	0	0
22.20	Unobligated Balances Transferred	(10)	0	0
23.90	TOTAL AVAILABLE	3,927	3,617	3,662
23.95	New Obligations	(2,841)	(3,169)	(3,214)
24.40	Unobligated balance, end of year	1,086	448	448
	New Budget Authority (gross), Detail			
40.20	Appropriation (special fund, definite)	2,664	2,531	3,214
	Change in Unpaid Obligations			
72.40	Obligated balance, start of year	176	568	634
73.10	New Obligations	2,841	3,169	3,214
73.20	Total Outlays (gross)	(2,273)	(2,535)	(2,571)
73.45	Adjustments in Unexpired Accounts	41	0	0
74.40	Obligated balance, end of year	568	634	643
	Outlays (gross), Detail			
86.90	From New Year Authority	2,273	2,535	2,571
86.93	From Current Balance	176	568	634
87.00	TOTAL	2,408	3,103	3,205
	Net Budget Authority and Outlays			
89.00	Budget Authority	2,664	2,531	3,214
90.00	Outlays	2,408	3,103	3,205

NUCLEAR WASTE TECHNICAL REVIEW BOARD

Salaries and Expenses
OBJECT CLASSIFICATION (in thousands of dollars)

Identification code 48-0500-0-1-271		95 ACT	96 EST	97 EST
Personnel compensation:				
11.1	Full-time permanent	1,374	1,381	1,438
11.3	Other than full-time permanent	292	430	475
11.5	Other personnel compensation	14	37	31
11.8	Special personal services payments	6	4	6
11.9	*Total personnel compensation*	*1,686*	*1,852*	*1,951*
12.1	Civilian personnel benefits	278	302	319
21.0	Travel and transportation of persons	259	251	303
23.1	Rental payments to GSA	220	225	220
23.3	Communications, utilities, misc	57	53	63
24.0	Printing and reproduction	20	20	25
25.1	Consulting services	98	64	75
25.2	Other services	114	108	150
25.3	Services from government accounts	59	40	52
26.0	Supplies and materials	42	33	44
31.0	Equipment	8	221	14
99.9	***Total obligations***	***2,841***	***3,169***	***3,214***

NUCLEAR WASTE TECHNICAL REVIEW BOARD

Salaries and Expenses
Personnel Summary

Identification code 48-0500-0-1-271	95 ACT	96 EST	97 EST
Total number of full-time permanent positions	22	22	20
Total compensable workyears: FTEs	27	27	25

NUCLEAR WASTE TECHNICAL REVIEW BOARD

Salaries and Expenses

(Including Transfer of Funds)

For necessary expenses of the Nuclear Waste Technical Review Board, as authorized by Public Law 104-46, section, $3,214,000, to be transferred from the Nuclear Waste Fund and to remain available until expended.

(Energy and Water Development Appropriation Act, 1996)

Disposal and Storage of Spent Nuclear Fuel — Finding the Right Balance

A Report to Congress
and
the Secretary of Energy

Nuclear Waste Technical Review Board
March 1996

Nuclear Waste Technical Review Board

Dr. John E. Cantlon, Chairman
Michigan State University, Emeritus

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California Institute of Technology, Emeritus

Mr. John W. Arendt
John W. Arendt Associates, Inc.

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Dr. Jeffrey J. Wong
California Environmental Protection Agency

Dr. Patrick A. Domenico*
Texas A&M University

Dr. Ellis D. Verink, Jr.*
University of Florida, Emeritus

Dr. Dennis L. Price**
Virginia Polytechnic Institute and State University

**Term expired on April 19, 1994; continuing as a consultant pending Presidential appointment/reappointment.*
***Term expired; vacancy filled.*

Executive Summary

The Nuclear Waste Policy Act of 1982, as amended, established a statutory basis for managing the nation's civilian (or commercially produced) spent nuclear fuel. The law established a process for siting, developing, licensing, and constructing an underground repository for the *permanent disposal* of that waste. Utilities were given the primary responsibility for storing spent fuel until it is accepted by the Department of Energy (DOE) for disposal at a repository — originally expected to begin operating in 1998. Since then, however, the repository operation schedule has been delayed several times, and according to testimony submitted to the U.S. Senate by the Secretary of Energy in December 1995, repository operations may be delayed again, perhaps until 2015. These delays, along with the absence of a federal centralized storage facility, similarly delay the prospect of federal acceptance and removal of the spent fuel from utility sites. As a result, much more commercial spent nuclear fuel will require *temporary storage* for much longer time periods than originally were anticipated.

Recently, as a result of concerns primarily on the part of nuclear utilities and public utility commissions, several legislative proposals have been introduced in Congress that would require the DOE to develop a federal centralized storage facility at or near Yucca Mountain, Nevada, that could begin accepting commercial spent nuclear fuel in 1998 or soon thereafter. In addition, a large group of state agencies and utilities have sued the DOE in the U.S. Court of Appeals for the District of Columbia to obtain a judgment that makes the DOE legally responsible to begin accepting utility spent fuel in 1998. These initiatives have placed storage at the forefront of the debate about the ultimate fate of spent fuel. They also portend a possible change in the nation's goal of timely disposal and a redirection in program focus — from permanent disposal to temporary storage.

The Board is encouraged by recent progress...at Yucca Mountain, Nevada

As a result of its technical review, the Board found the connection between storage and disposal to be key to any discussion about where to store commercial spent fuel. Although the DOE's disposal program has been subjected to much past criticism, the Board is encouraged by recent progress in site-characterization and repository development efforts at Yucca Mountain, the only site being characterized for potential repository development. The tunnel-boring machine excavated to the level of the proposed repository in November 1995. Key repository-level exploration and testing activities are being initiated. In addition, the DOE is making progress developing a clear and coherent waste isolation strategy, which should permit an improved delineation of priorities and a more efficient allocation of funds among the activities being conducted at Yucca Mountain. The Board believes that if the DOE can maintain the recent pace of underground exploration, testing, and analysis, sufficient information should be available to determine within five years if Yucca Mountain is suitable for repository development. Ironically, the changes being proposed in Congress to refocus program efforts on storage are coming at a time when previous investments in site characterization and repository development finally are beginning to pay off.

Debates during the past two decades about the storage of commercial spent fuel reflect the complexity of the issues, the diversity of perspectives, and the strongly held views of different stakeholders. Up to now, a broad consensus on this issue has eluded the nation. Ultimately, because of the controversy involved, any attempt to reach a decision about how to store commercial spent fuel over the long term will require making a series of value judgments.

Board conclusions and recommendations

After reviewing about two-dozen technical and nontechnical issues, the Board believes that *it is possible to find the right balance* between disposal and storage. Long-term spent fuel storage needs can be addressed in a way that keeps the goal of repository development on track.

Is there an urgent technical need for centralized storage of commercial spent fuel?

The Board sees no compelling *technical* or safety reason to move spent fuel to a centralized storage facility *for the next few years*. The methods now used to store spent fuel at reactor sites are safe and are likely to remain safe for decades to come. Despite some recent public opposition to utility efforts to develop additional storage, so far, utilities have been able to add new storage capacity at their sites when needed.

Will federal storage be needed in the future?

The Board believes that federal storage capacity *will* be needed *in the future* for two reasons. First, when a repository begins operating, a centralized storage capability will be needed to provide added flexibility to handle the waste. For example, storage would provide a buffer between the repository and the rest of the waste management system if waste emplacement rates in the repository are less than spent fuel acceptance rates. Storage capacity also offers technical advantages, such as allowing spent fuel to be mixed and matched to optimize the thermal loading of the repository to improve repository performance.

Second, commercial spent fuel storage needs will change markedly beginning around 2010. Until then, approximately 15,000 metric tons of new storage capacity will be needed at reactor sites. But beginning around 2010, large amounts of dry-cask storage will be required to allow removal of spent fuel from the storage pools of reactors that are being shut down. It is *at this time* that a federal storage facility operating at full scale will be most useful. A centralized facility will relieve utilities of the need to build new dry-storage capacity at shutdown reactors while accommodating any future institutional or technical uncertainties associated with the long-term storage of spent fuel.

Although currently prohibited by law, there is no *technical* reason why a centralized storage facility (and supporting transportation infrastructure) cannot be constructed prior to repository construction. In fact, because of the lead time needed for planning and development, the Board believes it would be practical to begin *planning* now for a federal storage facility(s) that can achieve full-scale operation (i.e., accept 3,000 metric tons/year) by 2010 when reactors begin shutting down in large numbers.

Can the right balance be found between meeting future spent fuel storage needs and continuing to pursue permanent disposal?

The nation needs both a repository development program and a plan to address future spent fuel storage needs

In the past whenever there has been a choice between storage and disposal, disposal has always been made the primary focus of the federal high-level waste management program. This is because the storage of commercial spent fuel is not an acceptable substitute for disposal. Ultimately, spent fuel (commercial and defense) as well as sizable amounts of high-level radioactive defense waste will have to be disposed of. The Board believes that the nation needs *both* a repository development program and a plan to address future spent fuel storage needs. However, efforts now to refocus the program from disposal to storage, especially at a time when budgets are tight, could jeopardize site-characterization and repository development efforts in three ways: (1) by competing with the disposal program for resources, (2) by causing a real or perceived prejudicing of a future decision about the suitability of the Yucca Mountain site, and (3) by eroding the impetus and political support for repository development.

Given the stage of the current site-characterization program and the fact that substantial new storage capacity will not be needed until 2010, the Board has concluded that it makes technical, management, and fiscal sense to await the decision on the suitability of the Yucca Mountain site for repository development before beginning development of a federal centralized storage facility. The

Board believes that the following approach *strikes the right balance* between maintaining the national goal of permanent disposal while meeting future storage needs.

- Disposal: The nation has a program for developing a repository for the permanent disposal of spent fuel. So far, no technical reasons have been found for abandoning the site being characterized at Yucca Mountain. The Board believes that if the DOE can maintain the recent pace of underground exploration, testing, and analysis, sufficient information should be available to determine within five years if the Yucca Mountain site is suitable. By *suitable* the Board means that there is a high probability that the site, along with the appropriate engineered barriers, can provide long-term waste isolation. Therefore, *the Board recommends that for the next several years the DOE continue to focus its efforts on evaluating the suitability of the Yucca Mountain site for repository development.*

- Storage: *The Board recommends that generic planning for a federal storage facility and for a supporting transportation infrastructure begin now at a funding level modest enough to avoid competition with the repository program. Development of the storage facility should be deferred until after a decision has been made about the suitability of the Yucca Mountain site* for hosting a repository. Because of the increased advantages of having a storage facility located at an operating repository site, *if Yucca Mountain proves suitable for repository development, the centralized storage facility should be located there.* Activities could begin around 2000 to construct a storage facility that would be operating at full scale by 2010 — at the repository site. Operation by this date would largely eliminate the need to store significant amounts of spent fuel at reactors after they are shut down.

  The Board also recommends developing storage incrementally by limiting the amount that can be transported to Yucca Mountain until the repository has been licensed for construction. This will address the potential risks associated with linking storage to the earlier milestone of site suitability, rather than waiting until the NRC licenses the construction of the repository as required by existing law.

  The Board suggests planning now for a limited-capacity backup facility, similar to the one previously authorized by the Nuclear Waste Policy Act, for emergency storage to be located at an existing federal nuclear facility. Development of the backup facility should begin only if a clear need for the facility is established. Its operation should be phased out once operation of a large storage facility at the repository site commences.

Development of the storage facility should be deferred until after a decision has been made about the suitability of Yucca Mountain for hosting a repository

The process of licensing and developing a large federal centralized storage facility and the transportation infrastructure that goes with it will take time; estimates range from five to seven years. Even if passed into law now, none of the proposals before Congress would enable operation of a centralized storage facility to begin much before 2002 — and then not at full scale. With the spent fuel stockpile currently at 32,000 metric tons and growing at 2,000 metric tons per year, it will take as long as 30 years to empty the inventory at all the individual reactor sites. So, developing a centralized storage facility at Yucca Mountain now would only *reduce*, but not eliminate, the need to continue adding spent fuel storage capacity at reactor sites. The Board's suggested approach differs from currently proposed strategies only by the time it will take to determine site suitability — at most five years.

To avoid having substantial amounts of spent fuel sitting at shutdown reactors...2010 is the key milestone

With respect to storage, 2010 is the key milestone. Being able to accept small amounts of spent fuel in 1998 or 2002 will address the storage concerns of only a few utilities. Being able to accept 3,000 metric tons per year for 30 years beginning in 2010 will be necessary to avoid having substantial amounts of spent fuel sitting at shutdown reactors.

How should the costs of federal storage be paid?

Given current funding projections, it appears that the Nuclear Waste Fund will be only marginally capable, at best, of supporting the long-term development and operation of a repository for the permanent disposal of spent fuel. Therefore, the costs of a limited federal storage facility could be recovered through a new fee assessed on the users of that facility. The costs of a large storage facility located at a repository site (which would be used for all spent fuel) could be recovered by increasing the current 1 mill-per-kwh fee going into the Nuclear Waste Fund. This would avoid having the taxpayer bear the costs of final closure of the repository.

What would it take to implement these recommendations?

These Board recommendations represent a departure from existing policies. The Nuclear Waste Policy Act currently links development of a storage facility to the construction of a repository. *The Board recommends that development of a storage facility at Yucca Mountain be linked to the earlier decision about the suitability of the Yucca Mountain site as defined above.*

This new approach is not free of risk. Given the inherent difficulties associated with proving safe repository performance over many thousands of years, a site-suitability decision would not be an iron-clad guarantee that the site could be developed as a repository. However, the Board believes that the risks of linking storage to a site-suitability decision, rather than to the NRC licensing decision, can be minimized if the DOE clearly delineates its site-characterization program and focuses on the timely completion of the needed scientific activities *and* if it continues to work closely with the oversight groups (e.g., the NRC) that have been involved thus far with the program. Working closely with these groups can help ensure that the decision about the suitability of Yucca Mountain for repository development is technically sound.

Successful development of a [waste management] system for the nation… will require sound program management and sufficient and consistent funding

Finally, successful development of a system for managing the nation's spent fuel and high-level waste will require sound program management and sufficient and consistent funding. Without adequate funding for disposal *and* storage, a significant amount of spent fuel will remain in storage at reactor sites well after large numbers of reactors begin shutting down in 2010.

Summary of Board recommendations

After evaluating various technical and policy-related considerations regarding federal centralized storage, the Board believes that it is possible *to find the right balance* between permanent disposal and temporary storage of commercial spent nuclear fuel.

1. Developing a permanent disposal capability should remain the primary national goal and, for the next several years, determining the suitability of the Yucca Mountain site should remain the primary objective of the DOE's waste management program. Assigning the Office of Civilian Radioactive Waste Management any significant new activities at this time could compete for funding and other resources with site-characterization and repository development efforts at the Yucca Mountain site.

2. The Board recommends that during the next several years *generic* planning for a centralized storage facility and for a supporting transportation infrastructure begin at a funding level modest enough to avoid competition with the repository program. From a technical, operational, and fiscal perspective, 2010 is the key milestone for storage. Therefore, plans should be made to have this storage facility operating at full capacity (able to accept 3,000 metric tons/year for 30 years) by about 2010. This will allow the federal government to remove

the backlog of spent fuel from those plants already shut down and to empty the pools at other plants as shutdowns occur.

3. The *construction* of a federal centralized storage facility should be deferred until after a decision has been made about the suitability of the Yucca Mountain site for repository development. If Yucca Mountain proves suitable, the centralized storage facility should be located there.

4. The Board recommends developing storage *incrementally* by limiting the amount that can be transported to Yucca Mountain until repository construction has been authorized by the NRC. This will address the potential risks associated with linking storage to the earlier milestone of site suitability.

5. The Board also recommends reauthorizing limited-capacity backup storage, similar to the one previously authorized by the Nuclear Waste Policy Act, at an existing federal nuclear facility. *Actual development* of the backup facility should begin only if a clear need for the facility is established. Its operation should be phased out once the operation of a large centralized storage facility commences.

6. Because siting a centralized storage facility may be extremely difficult without a viable disposal program, if the site at Yucca Mountain proves unacceptable for repository development, the Board recommends that other potential sites for *both* disposal and centralized storage be considered.

THURSDAY, MARCH 28, 1996.

OFFICE OF NAVAL REACTORS

WITNESS

ADMIRAL BRUCE DeMARS, U.S. NAVY, DIRECTOR, NAVAL NUCLEAR PROPULSION

OPENING REMARKS

Mr. MYERS. The committee will come to order.

Admiral, we apologize for the delay here and not giving you ample time possibly to sweep the room. I hoped we would have it swept by now; we ran a little late because of votes on the Floor.

And some housekeeping items here: Pursuant to the decision of the committee last Thursday, the hearing today will be closed. Only those with appropriate security clearances will remain in the room.

Admiral, for the committee staff, we have certified that they all have proper clearances. Would you give us verification?

Admiral DEMARS. Yes, sir, I have looked over the room and everybody on this side has proper clearance.

Mr. MYERS. I guess we are ready to take a dive. Your prepared statement will be placed in the record and you may proceed.

Admiral DEMARS. Thank you very much, Mr. Chairman. And let me say once again that it has always been a pleasure to come back and testify before this committee in the eight years that I have had this job; and though pleasures on the Hill are getting narrower and narrower, this remains an oasis of common sense and the ability to have a good dialogue, and so I appreciate that tremendously. I thank you for the time that you have allotted me.

Mr. MYERS. Thank you. It has been a pleasure working with you, and we wish you much success, too, since we are leaving—you are leaving before Mr. Bevill and I are leaving.

Admiral DEMARS. Just barely.

Mr. MYERS. I presume there are no cell phones in the room.

Admiral DEMARS. No, sir, I don't even own one.

Mr. MYERS. I do, but I wish someone else owned it.

Admiral DEMARS. What I would like to do is what I usually do and use some poster boards to get through and move through it fairly reasonably and entertain any questions that you might have.

NUCLEAR PROPULSION FOR WARSHIPS

I think you all are familiar with this (chart 1), but it is really to say that our program in the Navy is proud of what nuclear power has done for the Navy in the past, but it also has a very vital role in the future. It springs from the fact that nuclear power gives you the mobility and endurance which are very, very important not only to the submarines, where it is very apparent, but also for the aircraft carriers now and in the future.

With a smaller fleet, smaller today and smaller in the coming years, and the uncertainty around the world, the problem with overseas basing which will not get any better, and probably worse, the mobility and the endurance are going to be even more important in the future.

Also, I have here that it hedges against continued advances in technology. And there I refer to the continued increase in proliferation of space-based sensors and precision guided weapons, which means that the stealth and the mobility provided by nuclear power for both submarines and aircraft carriers is going to be even more important in the future.

THE NUCLEAR FLEET TODAY

I have the numbers for the turn of the century here (chart 2); About 40 percent of the combatants in the Navy are nuclear powered, and that number has stayed fairly constant throughout the Cold War. In the years ahead, even though the fleet is getting smaller, we are holding about the same percentage; and that is, of course, spread between attack submarines; strategic submarines; some cruisers, which are slowly going away; and aircraft carriers, which are increasing. We have eight now with two more under construction. So the bulk of the aircraft carrier fleet, the striking part of the Navy today, is nuclear powered and fulfills a lot of responsibilities in that area.

And the single deep-diving research submarine, the NR–1, which is nonmilitary, no torpedo tubes, but a tremendous depth and mobility, does a lot of both classified and unclassified science missions for the country. My gut feeling is that the Navy and the country will be a lot more interested in this sort of thing in the future, and there may be a potential for nuclear power in that area. We know an awful lot more between here and the moon than we do down a couple of miles in the ocean, and that is probably much more important for the future of the country..

I will talk a little bit about what has happened in this period of time, the last eight years and the next four years before the turn of the century, that has changed this program; and hopefully, we have stayed just a little bit ahead of the changes.

DOWNSIZING OF THE FLEET

The big change and the thing that has consumed most of our industrial efforts (chart 3) was the dropping of plans for 37 submarines that were going to be built between that 12-year period there. That amounted to about $70 billion. So if you were in the industry that was making those submarines, or parts for those submarines, you faced a big downturn in your business. That is the tough thing we had to come to grips with.

We have inactivated 73 nuclear powered submarines and a couple of surface ships. We have 28 more to go right now. This is a picture of the dry-dock where the ships are being taken apart. The reactor compartment gets cut out and transported to the DOE reservation at Hanford. That is just the reactor part of it; the core is out of it.

The core, we put another place; that is just the reactor part with the irradiated components in it.

We are very proud of this program. The rest of the submarine gets recycled. The steel gets cut up and sold back to the smelters. The diesel engine gets sold to some other government agency or given to some other government agency. They tell me that they even use the watertight hatches in some of the Federal dams to go in and out of the watertight spaces. We recycle about everything that we can. That which we cannot gets mashed up, melted down and so on. It really is a fine program that we are very pleased with.

Mr. BEVILL. Did you build any diesel-operated submarines?

Admiral DEMARS. No, we decommissioned the last diesel submarine about 10 years ago.

We inactivated this many ships; there are 54 reactor compartments here in the Hanford desert. On the other side of that, the Russians have inactivated [deleted] nuclear submarines. They have [deleted] reactor compartments that they have finally done this with; and the only reason they have done it is that we refuse to give them money to do it and finally forced them to do it on their own. Because it is not a high-tech operation, to do this sort of stuff; it is blacksmith sort of work. And if you know how to build them, you certainly ought to know how to inactivate them.

We are proud of that and we think it is the country's and probably the world's premier recycling effort.

CLOSING OF NUCLEAR SHIPYARDS

Here is another program that is unfortunate and unavoidable (chart 4), and that is the closing down of two nuclear capable shipyards, Charleston Naval Shipyard and Mare Island Naval Shipyard. They cease operations officially the first of next month.

I spoke at the closure of this two weeks ago, and I will speak at the closure of the Mare Island Naval Shipyard. We were doing nuclear work here for three decades and here for about four decades. So our goal was to go in and clean it up, as if we had never been there, so that nothing remained that was attributable to the Naval Nuclear Propulsion Program.

In both cases there are the costs. It adds up to about $240 million which I think in the scheme of cleaning up things nuclear in this country is really a bargain. Obviously, if we had done our job right, we should have known where everything is in the scheme of how this is closed up.

We have to survey all the areas, and we have to survey it to satisfy the local agencies and the EPA and our own standards, and clear our surveys through those. The square footage surveyed in both of these shipyards involved about 130 football fields in area, so we had to go around with instruments on essentially 240 football fields and try to find radioactivity that should not be there and take care of it.

The area that we had to remeditate was about one football field out to about the 40-yard line, so basically a pretty reasonable field goal these days. From 240-plus down to one football field out to the 40-yard line, and then the amount of radioactivity that we took out of that 40 yards that we remediated was the equivalent of about two smoke detectors that you might have in your house.

After 70 years of nuclear operations that was all the radioactivity that we found that we did not know where it was when we started, so that is a pretty good testament to the program, I think, and we are very proud of this remediation effort.

REDUCING NUCLEAR FUEL CYCLE

We changed completely our nuclear fuel—— (chart 5)

Mr. BEVILL. Is it all right for me to interrupt?

Mr. MYERS. Of course.

Mr. BEVILL. Is there any coordination with the Energy Department regarding how you all handle your nuclear waste? Do you exchange ideas?

Admiral DEMARS. Yes, and we all pretty much live by the same rules. If it is classified waste, it all goes to the same place; and if it is unclassified, it goes to the few remaining places in the country. The rules are the same for us as the rest of the Department of Energy. We have coordinated with them so they knew what we were doing. Obviously we have to defend our budget there, as well as in other places.

We are preparing an unclassified report of this total closure process that we will make available to any number of other people that are in this business, including the Russians. So, yes, sir——

Mr. BEVILL. Are you going to do any glassifying or get into that phase that our Energy Department is now moving into on nuclear waste?

Admiral DEMARS. Oh, the glassification. I misheard you; I thought you said classification.

No, what we have done that is different from probably what the program has done in the past, we have with a commercial company gotten into a melting-down at a place in Oak Ridge where we have sent materials to be melted down into solid blocks. Because when you put it in the ground, they charge you by the volume, so if you take a big tank and make something that big, it is cheaper to dispose of. We have gotten into that technology.

But our fuel, what we are doing with our fuel, which I think is what you are referring to on the DOE side, is that we are storing it in our pools out in Idaho for a period of time and now we in the process of moving that into dry storage. We are moving through an environmental impact statement now to develop a dry storage container system; and we will slowly then remove the fuel from those pools and put it in dry storage on the Idaho National Engineering Lab, and it will stay there awaiting the final repository, so we will be prepared for that. And although the Department of Energy has moved away from the multipurpose canister program, we have then—we were part of that program; we then started our own container system program because we think it is the right thing to do. But we aren't into the glassification.

We shut down the highly enriched uranium facility in Ohio. We were the only customer for highly enriched uranium. We went through the technical process that showed that we could use the bomb turn-ins that became available because of disarmament dismantlement, and we can convert that material to reactor feedstock. We are doing that and saving about $120 million per year.

We shut down the second fuel facility that we had built at Savannah River as a backup to the commercial vendor in Erwin, Tennessee. That was brought on line because during the Cold War it was felt that we did need two vendors to keep up. Obviously we don't now, so we only have one fuel supplier that saves us that amount of money per year; and we came up with a recommendation to cease naval fuel—spent fuel reprocessing out in Idaho, and the Department of Energy agreed with that. We came through that a number of years ago, so we don't reprocess fuel anymore.

As I am sure you know, that reprocessed fuel was used to fuel the weapons reactors. That is not needed anymore so that much money is saved in that area.

REDUCING MAJOR COMPONENT SOURCES

This chart (chart 6) refers to our supplier base, our vendor base, and some of the major components used to build reactors. And over this decade period we have gone from core vendors to a single one. We have gone from four heavy equipment vendors to one, two people who have made control rod drive mechanisms to one. We had at beginning of that time one pump supplier; we just did not have enough business in order to economically run this kind of an operation.

So we sat down, each sector, with the companies and told them that they were going to have to decide who the winner was. We were not going to do that, we were not going to give them any extra money to go out of business, we were worried about the people and the pension plans and that sort of thing, but thought all that could be handled if they came through it properly. And in each and every case, the one that remained is the one that we would have picked, which was the strongest supplier.

Mr. MYERS. I think it is better to ask you questions as we go along. What about the bidding situation where we only have one vendor?

Admiral DEMARS. That is a very good question. And it will be a problem eventually. Right now it is not a problem because we have managed to convince them that if they do not drive their costs down, we could price this thing, a nuclear submarine or a nuclear powered aircraft carrier propulsion plant, out of business; and it is very valuable for the country, but the taxpayers will not pay any price for it. They want to be assured they are getting the best possible price.

So far, we have good cooperation from these people. This line says they are engaged with us in reengineering their processes and looking hard at how they do things to bring down the cost of the components. What we have really done is move from high-rate production to low-rate production, and it is an entirely different business.

You can save money if you go on it hard. If you try and run it as if you were still in high-rate production with just one supplier, you waste a lot of money. So that is working. How long it will work, I don't know. I certainly hope it will work until October, but I think——

Mr. MYERS. Make it January, okay?

Admiral DEMARS. Even beyond that, I think the companies recognize that there is an imperative here to give value for the dollar.

Mr. MYERS. What about—are they able to compete in world markets?

Admiral DEMARS. Generally, in most cases, not. We have encouraged them. There have been some small things with the reactor coolant pump person, who has unique technology and makes sealed pumps that maybe can be used in offshore oil drilling because they work underwater, but by and large the unique requirements for shock and safety, that are more stringent in our program, even than the commercial nuclear power program—but this is on track. But you put your finger right on it: The future challenge is to hold the price down.

RESEARCH AND DEVELOPMENT TRAINING REACTOR SHUTDOWNS

We also have completely changed our prototype, our research and development and training reactor situation (chart 7). Eight years ago we had eight land-based reactors that we did research and development and training on, and we had no moored training ships where we only do training on them. Today, we have two operating research and development reactors in upstate New York that are reasonably modern, and we have two moored training ships down at the weapons station in Charleston. We do research and development and officer and enlisted training on these—we just do officer and enlisted training on these—and between the two of them, it certainly meets our needs now and in the foreseeable future for the program. The reason we went to these, they are a lot cheaper than these.

Building a new test reactor in this country—the last time we looked, it was about nine years ago—was upward of $3 billion, and that was if you already owned the land. These are about $250 million each, and we will get 20 years more life out of those. So we have completely changed that.

We are now in the midst of cleaning up these six reactors that we shut down. About half of them are defueled. We are remediating some of those. One of them, we are returning to a green field, which is a stand-alone site in Connecticut, and we are in the middle of that. Our approach to this has always been, clean up as you go; and that is why the bill for cleaning up the two naval shipyards was as low as it was, because we continue to clean up all the time, and we feel it is important to continue this cleanup now after we shut these reactors down.

SUBMARINE CONSTRUCTION

This is sort of a busy chart, but let me take you through it (chart 8).

The first part here shows the number of submarines that we were authorized to build in the 1980s, 38 submarines. That is part of this industrial downturn I talked about. The decade of the 1990s, we have five authorized and two more that are planned. So we went from 38 to, at the best, seven.

In the next decade, we are going to get up to a little more reasonable level; we will have one to two per year to satisfy the force level for submarines, which is about 55. And in the long term, as I said, I think we are going to continue to build nuclear submarines.

What we have are three of the SEAWOLF submarines that will be built, and then at the end of this year, in 1998, the authorization year for the lead ship of the new attack submarine class; and then we have planned right now one per year at some point in the next decade, we have to go to two per year to maintain the force level.

So this has been a fairly daunting task to go from that through this sort of confused area to here. We are in this now, we are on track with that we wanted to do, and we think we are managing it reasonably well. But it has been touch and go at a couple of points.

NEW ATTACK SUBMARINE

Let me talk a little but about the new attack submarine (chart 9). What we really did was parlay the research and development from the SEAWOLF submarine. We had learned a lot in the research and development program to develop that very fast, large, powerful submarine from the standpoint of capability, quieting and so on.

We took that and said, we want to build a less expensive submarine; and you don't get something for nothing, so we had to cut back on some of the military characteristics. We did not cut back on the quieting. The reason for having a submarine is that it is stealthy. We held the quieting level of the SEAWOLF submarine, and then had to reengineer so that we could package it in a submarine that is 25 percent smaller in volume. It is quite an engineering challenge because the way you normally quiet things is you make them bigger. So to get the same quieting in a smaller package is a technical challenge.

We also tried to make sure that this was adaptable for the future. So looking at the last chart, I think it is safe to say, we would have been happy, quite frankly, to a degree, coming off of this sort of thing to build almost anything to stay alive. But in fact we have designed and are getting ready to build a submarine that we are very, very proud of and that will meet the challenge into the future.

NEW SSN PROPULSION PLANT—NEW TECHNOLOGIES

It is just not something to keep the industrial base alive. It will be a very, very fine warship (chart 10). Some of the new technologies that are in it, we have a life-of-the-ship reactor core. We are going to put the core in when we build the ship and when we finish with the ship 33 years later, we will take that core out.

So we had to put a lot of increased energy density into this core, but you save a lot of money with no refuelings, and radiological considerations on shipyard workers and so on. Disposal issues are mitigated to a degree. So this was a big breakthrough.

We have designed a new steam generator, the thing that boils water and transfers the energy from the reactor plant to the steam plant. [Deleted].

[Deleted]. I think that this probably, several decades from now, will be something that the commercial people will want to get into because of the problems that it causes them.

We have many, many fewer components in the plant, and I will show you that on a subsequent chart. We have gotten into solid state electrical power distribution, instead of motor generator sets. You were on the aircraft carrier and you saw the rotating sets. We have gone to a solid state unit that electronically changes DC power to AC power or AC power to DC power just by wave-shaping. It is something that has been developed within the last 10 years, commercialized really in Japan and commercialized back over here; and it is coming strongly into the civilian commercial market now, and so it will position us well to be able to use something that is built commercially rather than the motor generator sets, which are getting to be fairly ancient technology nowadays.

[Deleted].

We have some advanced acoustic mounting, sound-quieting schemes and we are going to use a reverse osmosis, pure water distilling plant on this. It is really very similar to the plants that are used in the Mideast to make water in Saudi Arabia and that sort of thing. You basically push water through a membrane and separate out the salt from the water, and you get very pure water out of that. We have had that operating in a laboratory environment, and we have one installed on the USS Hartford today, and it is working fine. No problems at all. It will get us out of the steam distilling plants that are currently on the ships and is a reasonable step forward in the technology also.

Mr. BEVILL. That may be the answer to a clean water supply some day for the whole world.

Admiral DEMARS. Yes, I think that that is really a simple technology.

Mr. BEVILL. We will have the same amount of water 5,000 years from now, but the big question is, how much of it is going to be clean?

Admiral DEMARS. Yes, they went to that of necessity in the Mideast because as their industry increased over there and their population wanted a better way of life, they needed more fresh water, and so they got it from this system.

Mr. BEVILL. You might laugh, but we actually reached the point, at the time California had a drought for five years, and they were even talking about having aircraft carriers supply their drinking water in California. So that is how desperate we were getting in the planning stages.

NEW SSN PROPULSION PLANT—FEWER COMPONENTS

Admiral DEMARS. Yes, sir. Yes, sir.

Here is the simplification chart for the new submarine propulsion plant and this shows (chart 11) the percent of components as compared to today's Los Angeles Class (Improved 688 Class) and the SEAWOLF. You can see in the instrumentation and control cabinet it ranges from 40 to 70 percent and on down to where we literally went in and engineered every system to see what our accumulated technology from the Naval Nuclear Propulsion Program could provide in reducing the number of components and still have the reliability and safety that makes this program what it is. And so none of these simplifications have eaten at all into our classic margins of redundancy, reliability and safety; it is just taking advantage of what we have learned to date.

Mr. BEVILL. Did you do this in your lab?

Admiral DEMARS. Yes, sir, in the labs and in the shipyards.

NEW SNN PROPULSION PLANT—CONSTRUCTION COSTS

We worked hard on construction costs also (chart 12), and we are comfortable with this prediction that the man-hours will be about 30 percent less than required to build the SEAWOLF submarine plant and about 20 percent less than that required to build the plant for the 688, which is the backbone of the fleet today; but we really designed it to be easier to build, and I will show you that with just one example here.

I only brought one part of the model. This is just the reactor compartment and the compartment right after the reactor compartment that has all the instrumentation and controls for the new plant. You stack all the pieces together. It reaches over to the door there, and my staff was being particularly good in the last month because I threatened, if they were not, I was going to have them bring the whole thing over. The box is the size of a coffin.

The way we used to build submarines, you build the cylinder and cut holes and put the things in, very expensive and difficult. Everything had to be oversized. You—it is a little too big, and you cut a piece off and you fit it in, not a very good way to do it.

This way, we are going to build these sections of the hull. This is the reactor compartment here, with the core here in a pressure vessel right there, and the components in it, [Deleted].

[Deleted].

We will also build the instrumentation and control section the same way, put all of these cabinets in and the pumps and pipes and the valves in order to make this work here. Then when we get to a certain point where we are ready to test it, [Deleted]. It is the way we build submarines today, but this is an advancement on that.

[Deleted].

This process was started with the TRIDENT submarine. I think you know that. Then it was moved into the 688 class, and then to the SEAWOLF it has gone one more notch ahead with this class, more fully engineered, particularly in the reactor plant areas. That is why we expect to see these savings in construction man-days.

NEW SSN PROPULSION PLANT—LIFE CYCLE COSTS

We also worried about life-cycle costs (chart 13). What does it cost to maintain a ship like this over its 33-year lifetime? Look at the way we have built about 200 submarines in the history of the Nuclear Propulsion Program. We looked back through all that database. What do you spend your money on? What do you have to maintain? And we have gone in and tried to reengineer it to get rid of those things which we could get rid of. Fewer components, we talked about that. Solid state electrical plant, steam generator, no refueling, to attempt to lower the cost of ownership.

PROGRAM OVERVIEW

You have all seen this one before (chart 14), and we will go through it very quickly. It is what the program is obviously. I put us right in the middle, of course. But it is the fleet and that is the focus of all our work, our shipyards. We now have four naval nuclear-capable shipyards and two private builders Newport News and Electric Boat. Our schools, we are in the process of moving from Orlando, Florida, to the Weapons Station in Charleston because of the base closure business, and we will be completed with that in about two more years. Our research and development training reactors that I talked about, our specialized industrial base, our two dedicated laboratories—Bettis Power Lab, run by Westinghouse for us, and the Knolls Atomic Power Lab, run by Lockheed Martin as the government-owned contractor operating there. They do basically all our technical work in cooperation with the shipyards.

And then a key part of the program are the field representatives, who are people who work directly for me and are resident at each one of the shipyards—at nuclear power school, at the training sites, at some of the vendors, and at the laboratories—and report back to me weekly, both by letter and phone call, on what is going on, so we have a system that stays glued together, we always know what the problems are and, hopefully, are working on the most important one also.

PRIMARY JOB

Our primary business is to support the fleet (chart 15), and that is our priority. We have a large fleet, the largest operating nuclear power program, and so we have to keep working to keep them safe, reliable, to extend the life out, to replace equipment. As technology gets you into the digital world, we go back and replace the instrumentation and control systems, reduce maintenance and so forth.

The important thing is that it really requires continuous analysis and testing. You really have to test and make sure you know what you are doing. You just cannot sit down and decide you want to do something different and go ahead and do it.

That is why the labs are so critical to our operation. We can put things in the laboratories, we can test them, we can break them, we can examine them; and then decide, based on real data, what we should do. And it is the basis of this program; it doesn't get a lot of visibility, but it is key to the program because it is obviously a technical program.

RECORD OF EXCELLENCE

Just a little bragging here (chart 16). We have delivered 203 nuclear powered ships, steamed over I think it was two or three years ago, the 100-million-mile mark. Got a nice letter based on that from the President. And we are not really inviting the GAO back, but when they were last back in 1991, they looked over our program in a large amount of detail in the environmental, radiation safety and health matters and found no significant problems, which was a milestone for the GAO. I think it is in their museum, that report, because it has no deficiencies of any consequence.

WHAT MAKES NAVAL REACTORS TICK

What makes this business run is always somewhat difficult to figure out (chart 17), because it does run and most of us are involved in it. I think the issue is that we have a clearly defined mission, and we have always been very careful not to expand the scope of our operation, not to become a conglomerate. We recognize we do this stuff well because we are very narrowly focused. It doesn't mean we can do everything well or do a lot of other things well, but we cerainly—by focusing on this one mission, naval nuclear propulsion can do the job well.

We have the authority to carry out the mission. Not only the Executive order signed by President Reagan when Admiral Rickover retired, but the codification of that by the Congress. This is very, very important because we have dual agency status, as you know, Department of Defense and Department of Energy, each department wondering why that is and so on; but it is very important to sort of keep that separation of church and state.

On the one hand, I have a job in the Navy to develop things, and I have to understand naval things to do that properly. On the other hand, I am a regulator and I have to be able to stand back and say, I work for the Department of Energy; that is not safe, I want you to stop doing it, I want that to be shut down, and so on.

So that rarely comes into play, but it is very important, and certainly the Congress should always be interested. The fact that you have that separation, that you can make those difficult calls and have that perspective, that is necessary to separate that out.

People are at the heart of our business—we are fairly small as an operation; the headquarters I showed on the previous chart is about 400 people, and that includes the person that runs the mail room and several other groups.

Our people tend to be long in service with the program, not only in the headquarters, but at our two labs—working for our labs and our vendors. They tend to put in their whole career either in government service supporting naval reactors or in the private sector working for naval reactors. So people feel like they belong to the program. It is a fairly lean organization which does create a sense of responsibility and give an agility to the organization where we can make changes in a hurry and get on the problems.

The other thing that I would write across this whole thing is the confidence and the understanding from the Congress; that has always given us the confidence to do our work.

Admiral Rickover was a genius in many areas, but one of them that certainly stood the test of time to today is the fact that he understood that in order to manage this potentially dangerous technology, you had to keep the confidence of the American public; and the way that you kept the confidence of the American public most easily was through the Congress. So that is why a forum like this is so important. It forces us to sit down, put our thoughts down on paper, submit it to you, give you all the reports every year; and it engenders that sense of responsibility in us to come forward annually. And we know that it is important, and certainly we appreciate the support.

Finally, this is to show you we are not a very expensive organization (chart 18), we are just a little bit of a big organization. We are less than 4 percent of the entire Department of Energy funding and less than 1 percent of the Department of Energy people.

So that is my presentation, Mr. Chairman, and I am happy to answer any questions you might have.

[The prepared statement of Admiral DeMars appears at the end of the hearing record. The charts used during the presentation follow:]

NUCLEAR PROPULSION FOR WARSHIPS

A Preeminent and Revolutionary Naval Development

- Crucial to Cold War Victory
- Mobility and Unlimited Endurance
    - Submarine: True Stealth
    - Surface Ship: Greater Payload
    - Improves Survivability and Punch

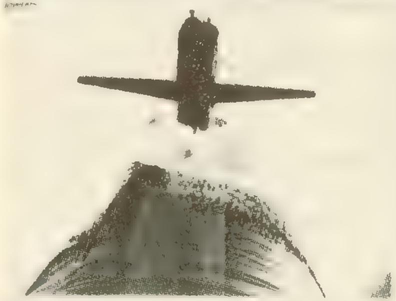
Vital Future Role

- Smaller Fleet
- Global Uncertainty
- Fewer Overseas Bases
- Hedges Continued Technology Advances
    - Space Based Sensors
    - Precision Guided Munitions

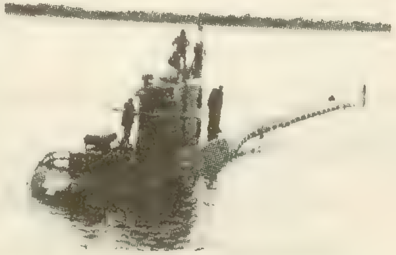
Chart 1

NUCLEAR FLEET

- Over 40% of the combatants nuclear powered
- 126 reactors in 107 warships, NR-1

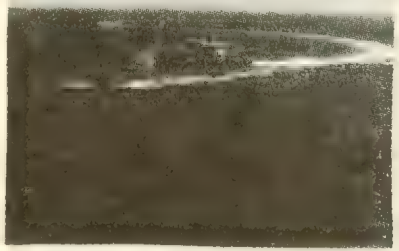


79 Attack Submarines
55 in 2000

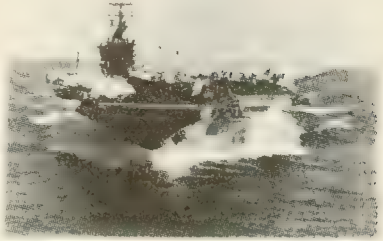


NR-1

16 Strategic Submarines
18 in 2000



4 Cruisers
2 in 2000



8 Aircraft Carriers
9 in 2000

Chart 2

POST COLD WAR REDUCTIONS
CLOSED TWO NUCLEAR CAPABLE NAVAL SHIPYARDS

Charleston

Nuclear closure cost: $124M

Mare Island

Nuclear closure cost: $117M

- Total Nuclear Closure Cost: $241M
    - 22% for Surveys
    - 39% for Dismantlement/Disposal
    - 39% for Transfer of Functions/ Equipment
- END STATE: FREE RELEASE -- AS IF WE HAD NEVER BEEN THERE
- PREMIER GOVERNMENT ENVIRONMENTAL REMEDIATION EFFORT

Chart 4

POST COLD WAR REDUCTIONS

DOWNSIZING OF FLEET (1988-2000)

- Dropped plans for 37 new subs, ~ $70B
- 73 ships inactivated, 28 to go

PREMIER GOVERNMENT POST COLD WAR RECYCLING PROGRAM

Chart 3

POST COLD WAR REDUCTIONS
NUCLEAR FUEL CYCLE

- SHUT DOWN HIGHLY ENRICHED URANIUM FACILITY
  - WILL USE SURPLUS WEAPONS URANIUM
  - SAVES $120M/YR

- SHUT DOWN SAVANNAH RIVER SITE NAVAL FUEL FACTORY
  - ONLY ONE NAVAL FUEL SUPPLIER REMAINS
  - SAVES $50M TO $70M/YR

- DOE IMPLEMENTED NAVAL REACTORS' RECOMMENDATION TO CEASE SPENT NAVAL FUEL REPROCESSING -- SAVES $100M/YR

Chart 5

POST COLD WAR REDUCTIONS

MAJOR COMPONENT SOURCES

COMPONENT	SOURCES	
	1980's	1990's
Reactor Cores	2	1
Heavy Equipment	4	1
Control Rod Drive Mechanisms	2	1
Main Coolant Pumps	1	1

WORKING WITH ALL SECTORS TO EFFICIENTLY SHIFT FROM HIGH RATE TO LOW RATE PRODUCTION -- REENGINEERING PROCESSES AND ORGANIZATIONS TO SAVE MONEY

Chart 6

POST COLD WAR REDUCTIONS

R&D/ TRAINING REACTOR SHUTDOWNS

- 6 of 8 Shore-based R&D/ training plants shut down
- 2 Shore-based R&D/ training plants will remain, plus 2 moored training ships
- Major effort underway to inactivate shut-down plants
  -- clean up "as you go" is best for Naval Reactors

Chart 7

SUBMARINE CONSTRUCTION

OBJECTIVE: SUSTAIN INDUSTRY WHILE SHIFTING TO LOW RATE PRODUCTION OF MORE AFFORDABLE SSN

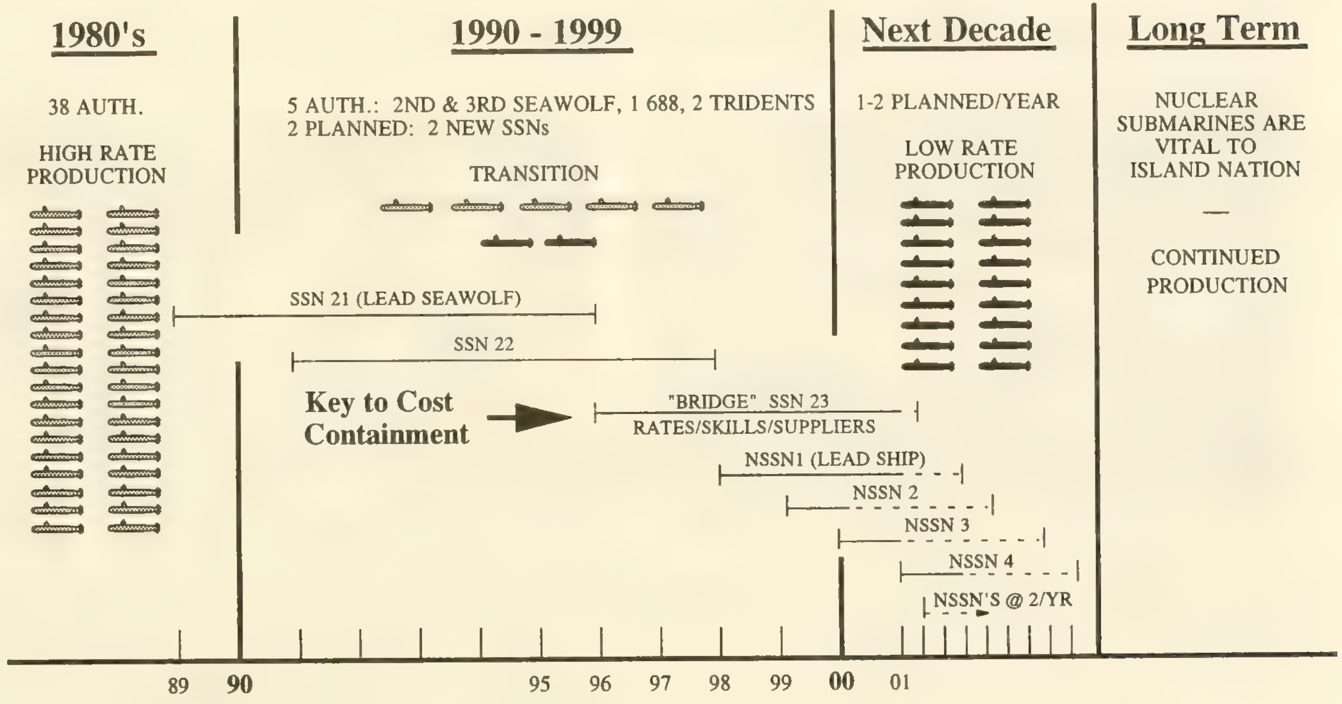


Chart 8

NEW ATTACK SUBMARINE

Highly Capable, Technologically Robust:

- *Meets all military requirements*
- *Seawolf advances and post-Seawolf technology*
- *Simplified, revolutionary design and construction techniques*

Affordable, Cost Close to New SSN 688I (60s Technology)

- *Lowest cost SSN with requisite military capability*
- *Balances capability and cost*

Flexible, Designed to Adopt Future Technology

- *Reconfigurable space (torpedo room)*
- *Advanced modular construction*

Chart 9

NEW SSN PROPULSION PLANT

NEW TECHNOLOGIES

- Life-of-Ship Core (25% Greater Energy Density)
- Revolutionary Steam Generator
- Simplified Plant, Fewer Components
- Solid State Electrical Power Distribution System

[Deleted]

- Advanced Acoustic Mounting Scheme
- Reverse Osmosis Water Distilling Plant

PLANT HAS SEAWOLF QUIETING IN 25% LESS VOLUME

Chart 10

NEW SSN PROPULSION PLANT
SIMPLIFICATION: FEWER COMPONENTS

Quantity of New SSN Components As % of Components In:	688I	SEAWOLF
Instrumentation & Control Cabinets	70%	40%
Circuit Breakers	60	70
Power Cables	50	50
Major Pumps	70	60
Major Reactor Plant Valves	50	55

Chart 11

NEW SSN PROPULSION PLANT
CONSTRUCTION COST

Fewer Construction Manhours

30%< SEAWOLF
20%< SSN 688I

Easier to Build

- Simpler design - fewer components
- Streamlined specifications
- Large deck structures
- New acoustic mounting technique
- Simpler radiation shielding

Chart 12

NEW SSN PROPULSION PLANT

LIFE CYCLE COST

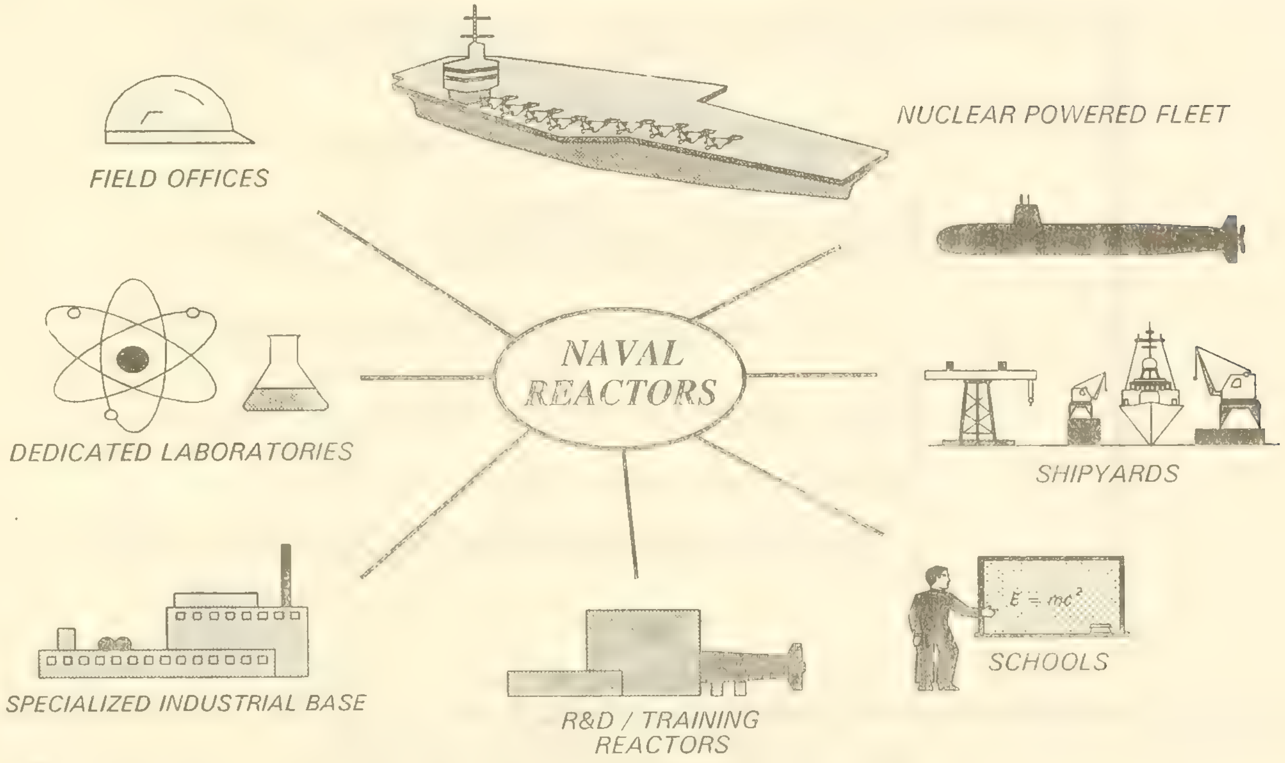
Reduced Maintenance Cost

- Many fewer items to maintain
- Solid state electric plant
- Reduced steam generator maintenance
- No refuelings -- life-of-ship core
- Lower radiation levels

Chart 13

NAVAL NUCLEAR PROPULSION PROGRAM

- A joint DOE / Navy effort
- Responsible for design, development, operation, and disposal of Naval nuclear propulsion plants



NAVAL REACTORS

NUCLEAR POWERED FLEET

SHIPYARDS

SCHOOLS

R&D / TRAINING REACTORS

SPECIALIZED INDUSTRIAL BASE

DEDICATED LABORATORIES

FIELD OFFICES

Chart 14

PRIMARY JOB:

SUPPORT PLANTS IN OPERATING SHIPS

Priorities

- *Keep plants safe and reliable*
- *Extend reactor core & plant life*
- *Replace obsolete equipment*
- *Reduce maintenance cost and ship time off-line*
- *Further improve plant performance*

Requires continuous analysis, testing and monitoring of plant and core performance

Fleet downsizing increases importance of each ship

Chart 15

RECORD OF EXCELLENCE

Delivered 203 nuclear ships -- propulsion plants provided unparalleled stealth and mobility, safely without harm to environment

Over 100 million miles safely steamed on nuclear power

President Clinton's letter of April 1994 states: "The Naval Nuclear Propulsion Program, with its high standards and efficiency, exemplifies the level of excellence we are working toward throughout our government"

GAO 14-month review (1991) of environmental, safety and health matters found "no significant deficiencies"

Chart 16

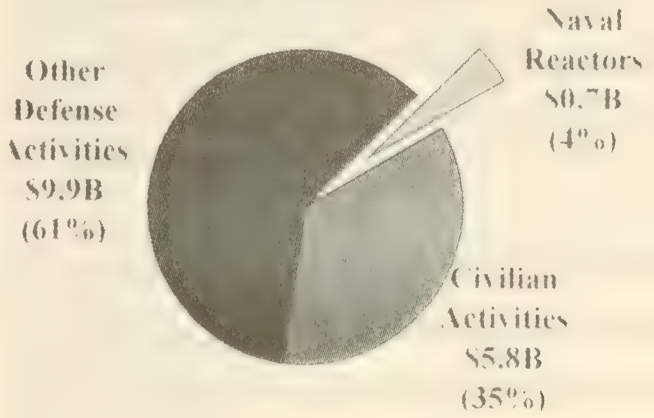
WHAT MAKES NAVAL REACTORS TICK?

- Clearly defined mission -- sufficiently broad scope to control work
- Authority to carry out mission (Executive Order 12344, 42 U.S.C. 7158)
- Dual agency arrangement
    - Provides arms-length relationship to Navy
    - Facilitates reactor engineering work and safety oversight
- Carefully selected, dedicated personnel
- Lean, flat organization
    - Creates sense of responsibility
    - Quick reporting of and action on problems
- Integrated approach to work -- development, operation, safety, environment

Chart 17

NAVAL REACTORS - DOE FY 1997

FUNDING



STAFFING

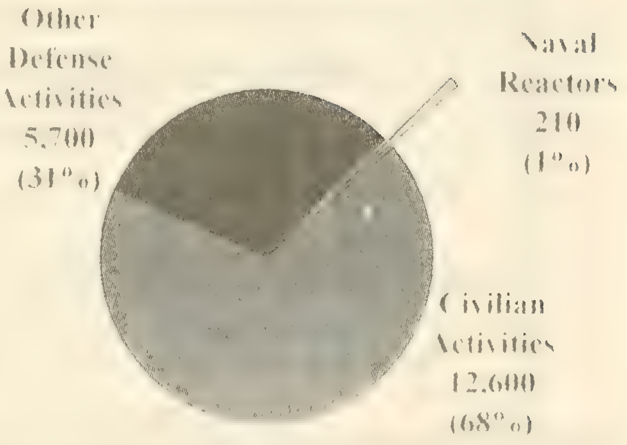


Chart 18

RUSSIAN SUBMARINE CAPABILITY AND DISPOSAL

Mr. MYERS. Thank you very much for a very fine presentation. Certainly the Navy has changed a lot in your career and the submarines certainly have changed a lot. In fact, we have no diesel anymore. I didn't realize that. You have given up your last diesel.

The one thing that still bothers me, we had the potential adversary of the Soviet Union; we don't have that today. We don't have any benchmark to be competitive and maybe that is a good thing, too; but what do we know now about the Soviet capability? They had a rather large nuclear fleet, and submarine fleet especially, not all of which were nuclear; but we hear stores constantly about which nations of the former Soviet Union control the submarines. What do we know about this?

Admiral DEMARS. We think we have a reasonable idea about what is going on there. You are never absolutely sure, but they have—they have had tremendous difficulties obviously.

I would preface all this be saying, I don't think they are going to be a problem, for at least a decade certainly, as they sort out what the future of their country is. It is something they can do within a decade, but it is clear they have continued to make their nuclear submarine force the centerpiece of their navy. In fact, they have tied up other parts of their Navy in order to support the nuclear submarine force.

They have also gotten—laid up a number of their older submarines. I think it was sort of a Russian thing never to throw anything away because you are going to need it in the next war. They have saved things for years and years. They finally realized, when they were in resource problems, they couldn't do that with these old nuclear power plants. So they have laid up over a hundred nuclear submarines; they are in the queue, waiting to dispose of them. They are down to an attack submarine force in the 60s and a strategic submarine force in the 30s, something like that.

But the important thing is they are continuing to develop and build. We expect their fourth generation submarine to come out in about two years, and the predictions are, it will be improved over today's submarine. An so they are—they continue to realize the advantages of stealth and nuclear powered submarines, and they clearly want to stay in the business.

Mr. MYERS. Thank you. We had a little problem of who was in the room, classified maybe, but—off the record.

[Discussion off the record.]

Mr. MYERS. Back on the record.

There are stories about how they have disposed of the reactors maybe even dumped some submarines. Is there any—is that substantiated yet?

Admiral DEMARS. Yes, sir, they even admit that they have dumped—I forget the exact number, something like twelve to 17 reactor plants off the coast of Novaya Zemlya, that large island just north of northern Russia up on the Barents Sea.

There have been subsequent samplings of those waters up there, with some international cooperation, and they have not really shown any large-scale contamination from that. The primary source of potential contamination in the Arctic from the ex-Soviet

Union are their weapons facilities up the rivers in Siberia that have drained into the Arctic over the years, and those are a much greater future risk that needs to be worked on than those twelve or fifteen reactor plants they have dumped there.

If you prioritize where they ought to be putting resources, it ought to be in remediating other things first, I think, is the general technical consensus in this country.

Mr. MYERS. How recently have they been dumping?

Admiral DEMARS. They stopped dumping reactor plants at least a decade ago, and certainly today when they decommission a submarine, they cut the reactor compartment out, like us. We put them in the desert at Hanford; they put them in floating waterborne storage alongside the pier, which is a strange thing to do because you have to keep it from sinking in addition to everything else, but they have problems in trying to figure out where to put it.

Mr. MYERS. They have had some accidents.

Admiral DEMARS. They have had a lot of accidents. They have had over ten what we would call "reactor accidents" over the last 30 years, where they have actually killed people either with high doses of radiation or live steam, things that are unheard of in our program; and it is because they have not been real careful.

Mr. MYERS. Russia still controls all of the submarines—

Admiral DEMARS. Yes, all of the nuclear fleet is controlled by Russia.

Mr. MYERS. Whether that is good or bad, I am not certain, but we were over there last summer, and we didn't feel a lot more secure.

Admiral DEMARS. Yes, sir.

MAINTAINING THE INDUSTRIAL BASE

Mr. MYERS. I am still concerned about what we are doing to our industrial capability. Mr. Bevill and I are older than everyone else in the room. You are getting close to that age—not yet; but we can remember when World War II broke out, and we had a long way to go, and we just were not prepared. And we hope and pray we don't get to that situation again, but history, if it means anything, we will sometime.

I am worried about the industrial base that we are destroying. Do you have any concern about this as you are retiring about what our children and grandchildren could expect?

Admiral DEMARS. I share the same concern for the sort of demise of heavy industry in this country. As we have—as we have drawn down facilities, we have always been careful to save some capacity for expansion; in other words, most of our facilities are now working one shift a day, and so if we had to go up to some more aggressive posture, we could go to second and third shifts, if necessary, and increase production. So I think that gives us some amount of solace that we have not cut ourselves too far to the bone. You don't pay that much more to have that excess capacity.

But as the same time, I think, outside of that in this country, there are very few vestiges of heavy industry; and I think that is a concern. We have to keep a capability and that is something the country will have to face more dramatically than it does now. We can't depend on overseas for as much as it looks like we are going to in the future, I don't believe.

Mr. MYERS. We shouldn't anyway.

Admiral DEMARS. Yes.

Mr. MYERS. I am very concerned in a number of areas involved with this committee, some of the radioisotopes not being produced here, and we are depending on other countries. That is one of the things we had to overcome in the very early 1940s, and I hope and pray we don't get to that condition. But the things you have shown us, the components you now have with only one supplier bothers me very much; but I understand if we are not building that many nuclear power plants or submarines you can't have a lot of providers.

Admiral DEMARS. Yes.

BASE CLOSURE

Mr. MYERS. Base closure bothers me very much, too. I think we need to close bases, but we are spending money on cleaning up bases that were closed that maybe we ought to have a higher priority. As far as I am concerned, we should provide family housing on the bases and put them in cold storage or standby condition, but your hand has been forced.

How much in your budget are you requesting to clean up the bases?

Admiral DEMARS. It comes out not, in my budget, except for my reactors, which are—I am not closing the bases; I am shutting down reactors in upstate New York, Connecticut and at the Idaho National Engineering Lab. So the remediation money in my budget is to de-fuel and remediate those reactors.

The base closure money that took care of the shipyards came from the Navy funds and not from my budget in the Navy funds.

Mr. MYERS. That comes out of our military construction.

Admiral DEMARS. Yes, in part.

Mr. MYERS. Next year, the request is $2.5 billion—a lot of money. Even though we need to close them, it will be a lot cheaper with our priorities that we should perhaps close them up, have a standby force to secure them, and start cleaning up later on.

Admiral DEMARS. For what it is worth, I think the things that we did at Mare Island and Charleston Naval Shipyard, even if you wanted to go to that scheme, would have had to be done anyway, because it was radioactive contamination; and you might as well clean that up and get out of that business before you were to mothball it anyway.

So I think that money was probably well spent, even if you intended to hold on to the land, or the base, which unfortunately the Navy doesn't.

Mr. MYERS. Okay. Well, my ten minutes are up.

Mr. Bevill.

Thank you.

APPLICATION OF EXTERNAL SAFETY REGULATIONS TO NAVAL REACTORS

Mr. BEVILL. Thank you, Mr. Chairman.

Admiral, there is a Federal advisory committee that recently recommended external safety regulations of DOE facilities. I am wondering, does this apply to the Naval Nuclear Propulsion program?

Admiral DEMARS. No, sir, it doesn't. We were able to make the case that we are a well-regulated program, based on the results; and also point out that external regulation does come at a price and, therefore, it is not free, so if it is needed, it should be done. If it is not needed, it shouldn't be done simply because it seems like the right thing to do.

I mean, you pay for external regulation in any number of ways. You pay for it from a monetary standpoint, you also pay for it in what I view as some abrogation of responsibility by the person that is being regulated because he thinks somebody else has the real onus for running the business rather than he himself.

So I think if a program is being run properly and can demonstrate that in the open, on the public record, it ought to continue to operate that way. If it isn't, then it ought to be externally regulated.

MANAGEMENT OF NUCLEAR WASTES

Mr. BEVILL. Admiral, I want to commend you for your presentations over the years. You know, we have hundreds of witnesses come before us each year, but nobody makes a better presentation than you have each year. Besides, you made a point to answer the questions extensively, and we appreciate you very much. The contributions you have made to the security of this country are appreciated.

I wish that somehow the word could get to the Department of Energy, you know, that they might handle their nuclear wastes more like the Navy does. You have a tremendous record. The Navy has a tremendous record in the nuclear waste program, and I am hoping that we might ask a few questions about that when the Secretary appears tomorrow, the Secretary of Energy, because it seems of all the managers in such a way you have practically a perfect record as far as safety. So we appreciate you.

Admiral DEMARS. Thank you. In defense of the rest of the Department of Energy, I would say that the only reason we manage it today is it started off being managed well and so we are able to continue that.

If it starts being managed in a different way, less rigorous way, which I think is the problem in the rest of the DOE, you have a long legacy that is very difficult to come to grips with. I think that is the difference. We started off with Admiral Rickover, who had a vision of this stuff that was certainly very, very important and that has stood us in good stead to this day.

Mr. BEVILL. He used to say—he would say once in a while I remember that, you know, if there is an accident in a nuclear submarine over in the Indian Ocean, he said, chances are I would know about it before the commander, the captain of the ship would.

Admiral DEMARS. That may have been a bit of hyperbole, having been the captain of a ship, but I would say there are a number of occasions in the eight years I have been here where I have called up somebody who should have known and they didn't when I talked to them about a problem in their plant or on their base or in their squadron. So we have a well-developed information system. I am not sure it is quite that good. Maybe it was that good when Admiral Rickover was running it.

Mr. BEVILL. It has been great to work with you, and we appreciate you very much.

Admiral DEMARS. Thank you very much.

Mr. MYERS. Do you have questions?

Mr. FRELINGHUYSEN. No.

Mr. Bunn?

Mr. BUNN. No questions.

Mr. MYERS. My goodness. I have two or three more since we have a few more moments.

In the spent fuel cycle, I am a little confused. You have changed in the years during your stay?

Admiral DEMARS. Yes, sir.

DISPOSAL OF NUCLEAR POWERED SHIPS

Mr. MYERS. During your watch. You handle it differently. But the ship is decommissioned where now?

Admiral DEMARS. It is decommissioned at any one of the four public shipyards and Newport News Shipbuilding.

Mr. MYERS. Public shipyards?

Admiral DEMARS. Yes, Portsmouth, New Hampshire; Norfolk Naval Shipyard; Puget Sound; or Pearl Harbor Naval Shipyard. We take the fuel out and do a certain amount of lay-up of the systems, and we prepare the vessel for towing; then it is towed from those shipyards other than Puget, to Puget Sound Naval Shipyard where the cut-up takes place. We cut out the reactor compartment and recycle the rest of the ship.

At that point, once we start cutting up, the fuel is out.

Mr. MYERS. Where is this now?

Admiral DEMARS. Puget Sound Naval Shipyard.

Mr. MYERS. Okay.

Admiral DEMARS. So we are in an assembly line process. Last year we did 11 reactor compartments that went to Hanford. We do it there because it is in close proximity to the site, and we barge it from the shipyard to Hanford.

Mr. MYERS. Is there any local opposition to the fact that you are cutting up these ships at the shipyard there?

Admiral DEMARS. No. We filed—in 1982, I believe it was, we filed an environmental impact statement that covered the entire process, got public comment, and we continue to work. Because while I am the regulator of things nuclear, I am not the regulator of hazardous materials; I have to deal with EPA and the State and all the other agencies on the other things. That is fine; we have learned how to do that, and we get a lot of cooperation from the State of Washington, the State of Oregon, other groups, the regional EPA for other matters. It has not been a problem.

It has been a fairly low-key program, and we are—as I said, we have done that to 54 submarine hulls so far out of the 70-some that have been decommissioned.

SPENT FUEL DISPOSAL

Mr. MYERS. On the shipment of spent fuel rods to Idaho, is there any problem with rail transportation?

Admiral DEMARS. No, we went through a big problem that took us about three years to resolve; if you remember, we were sued by the State of Idaho. We had a minor difference and the courts decided they were right, not the Navy. So in the process of working our way through that, we had limitations placed on fuel shipment for two years, and we had to store our fuel in the railcars in the shipyards, which is perfectly safe, but not something we prefer to do.

We settled that with the State of Idaho last year. We now have a 40-year deal to be able to send our fuel to Idaho for the next 40 years, and it is agreeable to both sides.

Mr. MYERS. Is there any consideration now of a permanent storage repository?

Admiral DEMARS. You know as much about that as I do. I think——

Mr. MYERS. We don't know very much.

Admiral DEMARS. It is an inevitability. It has to happen in this country sometime. Frequently, when I fly across the country and look down at the vastness of this country and the uninhabited spaces, I wonder why it is such a big problem. We have plenty of room. I think it will eventually come.

As I have said, all I am doing in my program is trying to prepare us so that when it comes we are ready. That is why we are moving from storage in pools to dry storage.

Mr. MYERS. Well, we have that suggestion for the civilian fuel, also, but how that will be resolved I don't know. But you were reprocessing for a while?

Admiral DEMARS. Yes, sir, we were initially, when the fuel was needed for the weapons reactors. When that stopped, we stopped reprocessing naval spent fuel.

Reprocessing, in and of itself, was not that great a deal because it did result in large volumes of very hazardous materials, because in reprocessing, you dissolve the fuel rods with acid so you are left with it, and you separate the uranium out and you are left with all the other stuff that is fairly noxious stuff that has to be taken care of.

Mr. MYERS. Just reduce the volume if nothing else.

Admiral DEMARS. It actually increases the volume. It increases volume by a factor of 14 if I remember——

Mr. MYERS. Waste volume?

Admiral DEMARS. Yes, because you take a lot of chemicals and melt it down, extract uranium, and you are left with most of the metal and all the by-products, the fuel by-products and so on, and all the acid. You have to deal with that. But if my memory serves me right, it increases volume by 10—I think it was 14.

Mr. MYERS. In France, it reduces the volume from a factor of 96 percent, as I recall. There is about a 3 percent, maybe 4 percent waste that they have to—they reprocess it, MOX fuel and so on. The volume is tremendously reduced, at least the last time we were there. We are going to go back sometime.

Each of us has a series of other questions for you, but we appreciate working with you, and we wish you well in your future, whatever you decide to do.

Admiral DEMARS. Thank you very much.

Mr. MYERS. You have done a great job for our country and we appreciate it. It has been a very difficult time and sizing down has not been an easy task for any of us, but you have done a great job and have a tremendous record of safety in getting the job done. So we wish you well. Thank you.

Admiral DEMARS. Thank you very much, Mr. Chairman. It is a pleasure.

Mr. MYERS. The committee will stand in recess for about 5 minutes while we get one show off the stage and bring the next show on.

[The prepared statement of Admiral DeMars and questions and answers for the record follow:]

ARRANGEMENT AND FUTURE OF THE NAVAL NUCLEAR PROPULSION PROGRAM

Mr. Myers. Please explain why the Naval Reactors program reports to both the Department of Energy and the Department of Defense.

ADM DeMars. The basic reason for the dual agency arrangement with the Navy and Energy Departments is to maintain an arms-length relationship with the Navy to ensure technical and safety objectivity and the wherewithal to carry out the Program's responsibilities. The intent is to allow the Navy the benefits of nuclear energy for propulsion while avoiding the pitfalls since the use of this demanding technology requires thorough engineering and constant critical oversight.

Mr. Myers. Is this still the best arrangement, or are there efficiencies which can be gained by moving Naval Reactors to DOD?

ADM DeMars. The dual agency arrangement has proven to be a lean and efficient way to balance the Navy's operational needs with safety, engineering and training requirements to ensure the safe and effective use of nuclear propulsion. The dual agency arrangement also has proven to be beneficial in giving needed assurance to foreign governments to allow U.S. nuclear powered warships into their territorial waters and ports.

I see no advantage in destroying this arrangement by moving the Program totally within the Defense Department. However, I do see a substantial drawback -- the loss of technical and safety objectivity and possibly the loss of the means to fulfill our responsibilities. President Reagan 15 years ago recognized the advantage of preserving the structure, policies and practices of the Program. This view was reinforced two years ago by President Clinton who noted the Program's high standards and efficiency and observed the Program exemplifies the level of excellence we are working toward throughout government.

NAVAL NUCLEAR INDUSTRIAL BASE

Mr. Myers. How has Naval Reactors been affected by mergers and restructurings within the defense industry?

ADM DeMars. The mergers and acquisitions that have taken place in the defense industry, such as the Martin Marietta acquisition of GE Aerospace and the subsequent Lockheed/Martin Marietta merger, have not significantly affected Naval Reactors.

Mr. Myers. In light of these events, do you feel the defense industry can continue to sufficiently support your program's mission?

ADM DeMars. While mergers have not been a problem, I have had to take an active role in the restructuring and downsizing of the naval nuclear industrial base. In the 1980s, we had two suppliers for most major segments and had competition for most components. I am now down to one supplier in each major segment. By leading this restructuring and downsizing process since the late 1980s, I was able to avoid litigation, disputes, or reliance on financially unstable suppliers that likely would have occurred otherwise.

Mr. Myers. What is the long-term outlook for the naval nuclear industrial base?

ADM DeMars. The naval nuclear industrial base is now at a level that can support low rate production and will survive if shipsets of nuclear components are procured at a rate of at least one per year, per the Navy's current shipbuilding profile.

BASE REALIGNMENT AND CLOSURE

Mr. Myers. Please describe the effect of base closures on the Naval Nuclear Propulsion Program. Are you experiencing any problems related to base realignment and closure?

ADM DeMars. The Naval Nuclear Propulsion Program has not encountered any significant problems related to base realignments and closures. Closure of the nuclear-capable Charleston and Mare Island Naval Shipyards will occur as scheduled and within budget. All necessary Program functions and work have been transferred to remaining nuclear-capable shipyards.

Despite over 30 years of nuclear propulsion work, there were no significant radiological problems associated with closure at either shipyard. Closure was accomplished in only two and a half years, completing ship work in the process, and under close oversight by both the EPA and the States of California and South Carolina. To meet standards set by the state and federal environmental regulators for public release, in some instances the Navy complied with cleanup limits which were more stringent than those used by the Nuclear Regulatory Commission for commercial nuclear facilities. This incurred additional effort. The fact the shipyards were maintained radiologically clean throughout the Navy's tenure allowed us to complete closure to this tighter standard within the time allotted and within budget.

The land at both shipyards has been released for unrestricted use with respect to Naval Nuclear Propulsion Program radioactivity. The states and EPA have agreed.

NEW ATTACK SUBMARINE

Mr. Myers. There has been substantial debate about the technical sufficiency of New Attack Submarine technology and capability. What are your views on this issue?

ADM DeMars. The New Attack Submarine will be a highly capable, technologically robust warship which incorporates an affordable mix of technologies which meet all mission requirements established by the Joint Staff. The NSSN design includes the state-of-the-art technology that has become available since the need for a more affordable SSN was recognized in 1990, and features dramatic new approaches which will cost effectively accommodate new technologies as they mature and as they are needed to satisfy new military requirements. Also, the NSSN's reactor core is being designed to last the entire life of the ship and will not require mid-life refueling. This will save hundreds of millions of dollars.

FUTURE AIRCRAFT CARRIER DESIGN

Mr. Myers. You note in your statement the Navy is evaluating requirements for a new class of aircraft carriers. What role does the Naval Nuclear Propulsion Program have in this evaluation?

ADM DeMars. Naval Reactors is participating with the Naval Sea Systems Command and other Navy activities in conducting studies to determine what characteristics and technologies are appropriate for future aircraft carriers. This evaluation is a multi-year process, which has just begun. Propulsion concepts under review include nuclear propulsion. Eight of the twelve aircraft carriers in service today are nuclear powered and two more are under construction. With that level of commitment, and with the demonstrated operational successes and safety record of nuclear powered carriers, nuclear propulsion is proven and offers unique capabilities. I expect these design studies to give an equitable accounting of the tradeoffs among all of the propulsion concepts being considered.

AGREEMENT WITH STATE OF IDAHO

Mr. Myers. How will the agreement between the State of Idaho and the Federal Government affect Naval Reactors?

ADM DeMars. The agreement, accepted by the federal district court in Idaho on October 17, 1995, provides for Naval spent fuel to be shipped to the Naval Reactors Facility at the Idaho National Engineering Laboratory for examination through the year 2035, and to be stored there until a permanent repository or interim storage facilitiy opens outside Idaho, whichever comes sooner. For Naval spent fuel shipments to proceed, however, the Naval Nuclear Propulsion Program must fulfill over the next several years a number of obligations regarding Naval spent fuel management and storage in Idaho and environmental remediation work at the Naval Reactors Facility. Thus, as long as we fulfill or obligations, this agreement guarantees that we will be able to manage Naval spent fuel generated through the year 2035 without disruption to Navy operations. It is an equitable arrangement for all the parties.

DISPOSITION OF NAVAL SPENT FUEL

Mr. Myers. How involved has your program been in working with the Department of Energy to develop a final repository for Naval spent fuel?

ADM DeMars. We are working closely with other DOE offices to ensure that the obligations of the agreement with Idaho, calling for Naval spent fuel to be shipped to a repository or interim storage site outside Idaho by 2035, are met. Characterizing, designing and building such a facility are the responsibility of the DOE with the Nuclear Regulatory Commission acting as the licensing authority.

The Navy is providing technical support for those DOE efforts aimed at ensuring spent fuel is properly packaged and certified for safe interim storage and ultimate disposal. These elements are essential to the actual use of such facilities. As part of that effort, the Navy is preparing an Environmental Impact Statement covering selection of a container system for dry storage and shipment of Naval spent fuel to a repository or interim storage facility outside Idaho, once one becomes available. The Navy's efforts will ensure that Naval spent fuel will be "road ready" once the facility is ready to receive spent fuel. I should note in this regard that the total amount of Naval spent fuel projected to be in existence by the year 2035 is 65 metric tons of heavy metal. By comparison, the DOE projects that over 85,000 metric tons of commercial spent fuel and 2,700 metric tons of DOE spent fuel will also exist by 2035, so Naval spent fuel represents less than 0.1% of the amount which will need to be shipped to a repository or interim storage facility.

Mr. Myers. How would the introduction of interim storage at Yucca Mountain or elsewhere outside Idaho affect the negotiated settlement with Idaho for naval spent fuel? What happens to naval spent fuel if a permanent or interim storage site outside Idaho does not open?

ADM DeMars. The agreement requires the removal of naval spent fuel from Idaho by 2035 either to a permanent repository or interim storage facility outside Idaho. Thus, interim storage at Yucca Mountain or some other location outside Idaho would allow the Navy to fulfill its obligation. If neither facility opens by 2035, then under the agreement, the government will be required to pay $60,000 per day to Idaho for each day any naval or DOE spent fuel remains in Idaho.

RADIATION EXPOSURE

Mr. Myers. How much radiation exposure is received by the public from naval spent fuel shipments?

ADM DeMars. The joint DOE/Navy Environmental Impact Statement on spent fuel management, published in April 1995, fully evaluates the impacts of shipping naval spent fuel to the Idaho National Engineering Laboratory. For the approximately 600 container shipments of naval spent fuel made between 1957 and April 1995, the EIS calculates a total public radiation exposure of about two man-rem, and for the 575 container shipments of naval spent fuel projected between April 1995 and 2035, 44 of which have been completed, the EIS projects about another two man-rem of exposure.

For perspective, two man-rem is less than the annual radiation exposure allowed for a single worker under DOE and Nuclear Regulatory Commission rules, and it results in less than one chance in 1,000 of a single latent cancer fatality occurring among the entire population over the forty year period evaluated.

An important point to understand is that the one chance in 1,000 is not the probability of each exposed individual getting cancer, but rather the probability of a single latent cancer fatality among the over 8,000,000 people along the transportation corridors. Over that same forty year period, about 10% of those people (800,000) will die from cancer from all causes. Thus, the additional risk associated with naval spent fuel shipments is negligible.

NAVAL SPENT FUEL RAIL ACCIDENTS

Mr. Myers. Has there ever been a serious rail accident involving naval spent fuel? How much risk is there from such shipments if an accident were to occur?

ADM DeMars. There has never been a serious rail accident involving naval spent fuel. The accident risks associated with shipment of naval spent fuel were fully evaluated in the joint DOE/Navy spent fuel EIS published in April 1995. The analyses showed that for the 575 container shipments of naval spent fuel projected between 1995 and 2035, there was about one chance in two of a fatality due to a train accidentally running over someone, but less than one chance in 25,000 of a single latent cancer fatality from the radioactivity associated with a transportation accident. The latter risk is so low for two reasons. First, naval spent fuel is in a solid, metallic form and is designed to military standards of high structural integrity, making it very unlikely that substantial amounts of radioactivity would be released even in a serious accident. Second, the containers used to transport naval spent fuel are very rugged and unlikely to be breached even in a serious accident. For example, the M-140 naval spent fuel shipping container is a cylinder with a wall thickness of 14 inches of stainless steel -- thicker than a battleship turret.

RUSSIAN SUBMARINE DISMANTLEMENT

Mr. Myers. Please give us an update on the environmental studies related to the radioactive material dumped by the Russians in the Artic.

ADM DeMars. The Office of Naval Research is the lead agency for these studies. They have found no significant contamination from the material dumped by the Russians. In fact, only very low and very localized contamination has been found close to some of the dumped material. This conclusion has been confirmed by other countries' studies, including Norway who has decided they do not need to perform additional wide ranging cruises to monitor this material.

Mr. Myers. It has been reported that the Russians have a problem disposing of their old nuclear powered submarines even as they continue to build new ones. Can you discuss this issue?

ADM DeMars. Under the Cooperative Threat Reduction Program, Russia has been provided with over $25M worth of typical ship breaking equipment such as torches, calbe shredders, grinders, etc. for use on missile compartments. This equipment can be used for the remainder of the ship. These have been provided to Russia's threee declared shipyards for dismantlement of SSBN's. Unfortunately, even with this help, the slow Russian progress on disposal of their submarines is due to lack of commitment to solve this problem.

Trilateral and bilateral discussions between the U.S. Defense Department and the Russian and Norwegian Ministries of Defense have examined environmental impacts on the Arctic due to military activities including nuclear powered ship dismantlement. My staff has been part of these delegations and has provided presentations on how we dismantle our submarines and dispose of our wastes. The Russians have presented detailed plans for dealing with disposing of their submarines, but their plans are not backed up by dedicated resources. They also recognize it is not a matter of technology, but a matter of applying sufficient resources to get the job done.

I should note they are finding the resources to build very capable, new submarines while failing to dismantle their decommissioned submarines.

ARRANGEMENT AND FUTURE OF THE NAVAL NUCLEAR PROPULSION PROGRAM

Mr. Myers. Have DOE strategic realignment initiatives impacted Naval Reactors?

ADM DeMars. No, but we have made selective, minor changes to accommodate Departmental administrative actions.

Mr. Myers. Why does Naval Reactors continue to need two laboratories when the nuclear Navy is being downsized?

ADM DeMars. As part of the overall downsizing of the Program I noted in my statement, we have significantly cut back at the laboratories. The laboratory downsizing also has been made possible by technical advances. For example, the gain in computing capability to process and make predictions based on the performance data accumulated over four decades coupled with a decline in the number of plant operators we have to train allowed us to shut down six of our eight test reactors. These shutdowns and other such actions will allow us to downsize laboratory staff by 28 percent by the end of this decade to a level of 5,500 people.

While several DOE laboratories have staffs of this size in one location, we consider two smaller sites are preferable. For one reason, the cost to consolidate would be prohibitive given the expense of moving people, constructing office space for them and replicating needed test facilities at the surviving site. More importantly, the division of work between the two laboratories and the ability to shift work, if necessary, provides technical competition, helps ensure efficiency, and allows for peer review without duplication of effort. With the decline in number of nuclear capable suppliers, the expertise and test facilities at the laboratories have become even more important to ensuring the continued ability of the Program to provide safe, reliable nuclear propulsion plants to the Navy. In this regard, the physical separation also precludes extreme disruption to the Program if a disaster such as a fire were to badly damage a site.

Simply put, the laboratories taken together efficiently and economically provide the technical expertise needed by the Program. One of the existing laboratories alone would not be sufficient to do the projected work, and I do not see a meaningful financial or technical benefit to consolidating the laboratories. To the contrary, having two smaller laboratories gives a decided technical advantage to the Program.

FOREIGN SUBMARINE CAPABILITIES

Mr. Myers. Can you update us on the capability of Russian submarines?

ADM DeMars. Despite the political changes and economic turmoil, Russia continues to operate a highly capable submarine force. Heavy emphasis continues to be placed on submarine development, construction and maintenance programs. In 1993, the Russian Minister of Defense publicly stated "A nuclear submarine fleet is the future of the armed forces."

Older, maintenance-intensive submarines are being taken out of service and replaced by fewer but qualitatively more capable and sophisticated ships. The Russian are both upgrading their newer operating ships and constructing new ones. They have under construction AKULA II and OSCAR II nuclear powered submarines, KILO diesel/electric powered submarines, as well as the lead ship of their next generation nuclear powered attack submarine class, the SEVERODVINSK.

From their espionage efforts in the 1980's, the Russians learned how far behind they were in quieting. They established dynamic and long-term acoustic and magnetic quieting programs which have proven to be effective. Last year the Navy noted the Russians have six Improved AKULA-class submarines, their newest ships, which are as quiet as our submarines at low speed. Russian acoustic programs are expected to continue and provide still further reductions in radiated noise.

Mr. Myers. What about other countries?

ADM DeMars. At present, there are over 550 submarines worldwide operated by some 44 countries, of which five have nuclear-powered submarines. While the total number of submarines is expected to decline over the next few years, those remaining will generally have improved capabilities. Worldwide, submarine technology continues to improve to meet increasingly varied mission requirements. Until recently, only a small fraction of the submarine-owning countries were considered to be moderately to highly-proficient in submarine warfare; however, several Third World submarine navies have made significant strides in submarine operational proficiency in recent years.

NAVY PERSONNEL

Mr. Myers. With the Navy downsizing, are you still able to attract sufficient personnel for nuclear programs?

ADM DeMars. Navy recruiters are struggling to bring the required number of enlisted recruits into the nuclear power program. For the first time ever, they may not make enlisted nuclear field recruiting goals for April and May of 1996.

Several factors have combined to make recruiting for the nuclear area increasingly difficult for both officers and enlisted. The population of 17-21 year olds has fallen at the same time that a higher percentage of high school graduates are going to college. The need for nuclear trained personnel is down 18% compared to the Navy overall reduction of 25% due to the increasing number of CVNs and ships which are decommissioning must continue to be manned until they are defueled. Competition for officer candidates and the pull toward civilian employment is strong. An increasingly technologically-oriented economy with low unemployment competes with the Naval Nuclear Propulsion Program for those college students who choose technical fields.

Mr. Myers. How is the morale of nuclear powered ship crews today?

ADM DeMars. During the past year I have traveled to each of the six nuclear powered ship homeports and visited over half of the Navy's submarines, and nuclear powered carriers and cruisers. The officers and sailors on these ships continue to be very dedicated and mission-oriented, and are performing some highly demanding duties. However, I would say morale is not as high as it has been.

There is a high level of anxiety stemming from uncertainty about the future. The officers and sailors see the number of commitments and missions staying constant, while the force structure decreases. Time away from home, uncertainty about their future career possibilities and quality of life degradation due to eroding purchasing power of their pay are starting to take their toll. Last year, for example, 84 percent of submarine officers leaving the Navy cited poor quality of life or worries over future promotion as their reason for doing so. Sailors have similar concerns; the level of pay and anxiety about advancement opportunity are the top two reasons they cite when leaving the service. These factors reinforce the need to improve the nuclear bonuses for these critical people.

ARRANGEMENT AND FUTURE OF THE NAVAL NUCLEAR PROPULSION PROGRAM

Mr. Knollenberg. What is the future of the Naval Reactors Program?

ADM DeMars. As I noted previously, though there will be fewer nuclear powered warships in the future, the percentage they represent will remain about the same due to the overall decrease in the fleet. Thus, nuclear powered warships will continue to be of great significance to the Navy. In fact, the value of each ship will grow if the current experience of declining resources, but undiminished demand continues. Moreover, even if no further nuclear powered warships were authorized, those in commission and currently being built would remain in service for up to another half century -- longer than the Naval Nuclear Propulsion Program has existed so far.

With nuclear powered warships remaining a large portion of the Navy's combatant fleet, the Program will continue to serve the same role as in the past. Based on the superb performance, safety and environmental record of nuclear powered warships over the past four decades, I see no need to change any aspect of the Program other than to complete our current downsizing. My statement and subsequent testimony noted our efforts in this regard and accomplishments to date.

Statement of Admiral Bruce DeMars
Director, Naval Nuclear Propulsion
FY 1997 Appropriations Hearings

I am now in my eighth and final year as Director of the Naval Nuclear Propulsion Program. These have been tumultuous years for the world, our Nation, the Navy, and the Naval Nuclear Propulsion Program. Today, I will sketch what has been done to take the Program from a Cold War posture and shape it for the 21st Century.

CHALLENGING TIMES

When I became Director in October 1988, the Soviet Union was a world power, and its naval force operated worldwide. Our Navy had five nuclear powered aircraft carriers, nine nuclear powered cruisers, 97 nuclear attack submarines, and 36 nuclear ballistic missile submarines operating, with another 32 nuclear powered warships under construction and 14 more included in the five year plan.

Nuclear Fleet Downsizing

As a symbol of changing times, the Berlin Wall fell in 1989. The Soviet Union unraveled in 1991, and the SEAWOLF attack submarine program was terminated in 1992. This was one of the initial steps leading to a wholesale Department of Defense review of defense requirements, completed in 1993.

For nuclear powered warships, the result of this and subsequent changes leads to roughly 55 attack submarines, 18 ballistic missile submarines, nine carriers, and two cruisers by the start of the next decade. To get there, the Navy has inactivated 73 nuclear powered ships with 28 more to go, and dropped plans for 37 submarines -- a savings in new nuclear powered warship construction of $70 billion. The submarine building plan for the 90s is six or seven ships compared to 38 planned at the beginning of this decade. In the next decade we expect to build one or two SSNs per year.

Meeting the Challenge

The challenge was, and continues to be, to get through this downsizing while maintaining the fleet's ability to carry out missions and operate safely. This means sustaining a skilled industrial base for ship and nuclear propulsion plant design and construction; dealing with the results of downsizing -- disposing of ships, shutting down facilities and reducing the workforce in a conscientious, safe and economical manner. We must also provide for the future by developing technology leading to ships capable of meeting the threat while being affordable.

We are following an integrated plan involving retiring older ship classes and a few ships at mid-life, while maintaining industrial capability through a small but continuing shipbuilding program. We have an aggressive program to responsibly and promptly deal with decommissioned ships by a combination of recycling following fuel removal, and land disposal of the defueled ship reactor compartments at the Hanford reservation Today, we are midway through the plan, and are on course. This has not been easy -- major, rapid shifts in direction are never easy, and we have had to deal with many stumbling blocks along the way, some of which still remain.

For FY 1996, Congress approved long lead funds to start on a class of new nuclear attack submarines This is a key aspect of our plan and allowed us for the first time in five years to order submarine propulsion plant components. We now have a program to sustain a long term ability to build submarines and nuclear propulsion plants.

This Committee's support of our reactor plant development work has enabled us to proceed with the development of the New Attack Submarine -- a key factor in sustaining a nuclear propulsion plant development program. Now, the challenge is to maintain a sustained building program for this new submarine class. The necessary low building rate will require incorporating advances in later ships of the class earlier and on a more formal basis.

IMPORTANCE OF NUCLEAR POWERED WARSHIPS

Nuclear Powered Warship Capabilities

As the Navy downsizes, dependence on each warship grows Taken as a whole, nuclear powered warships are extremely versatile and highly mobile -- marked advantages when the Navy must employ fewer ships to deal with widely dispersed crises and threats.

Aircraft carriers are the Nation's key means of rapidly projecting power -- they have an awesome punch, and their use lessens dependence on foreign basing and foreign government approval Today, eight of twelve carriers are nuclear powered, in five years ten of twelve will be nuclear powered.

Nuclear powered carriers have unlimited range and they come with a built-in 20+ year fuel supply They can cover long distances quickly, and arrive ready to fight They have a large storage capacity for weapons, jet fuel, and escort ship fuel, which increases on-line time and ability to strike hard. As a result, they are less dependent on the logistics train -- a key readiness and endurance multiplier. As an example, in late 1994 the USS GEORGE WASHINGTON (CVN-73) supported U.S efforts in Bosnia, then made an emergency deployment to the Arabian Gulf, steaming 4,400 miles in seven days to deter Iraqi feints against Kuwait, conducting air operations and refueling escorts enroute. With regard to air operations, the GEORGE WASHINGTON, even in the most protracted period, had aboard more jet fuel than a conventionally powered carrier with full jet fuel tanks This past week, the USS NIMITZ (CVN 68) completed a 5,000 mile transit from the Arabian Gulf to the Taiwan Straits area to support U.S. interests

Nonetheless, the Russians clearly have made significant advances and narrowed our advantage. Their espionage successes in the 1980's told them how easily we detected them and how quiet we were -- revelations they could not ignore. Moreover, as with many technologies, gains in quieting come incrementally -- each marginal decrease in noise level is harder and more costly to achieve. The same is true for weapons system development. At some point, new ship designs are necessary to obtain full advantage of technological advances. The Navy's latest submarine classes, SEAWOLF and New Attack Submarine, will be substantially quieter than the latest LOS ANGELES Class ships and will reestablish our acoustic margin.

SUBMARINE DEVELOPMENT AND BUILDING

SSN 23 -- A Bridge to the New Attack Submarine

The SEAWOLF Class nuclear attack submarine was designed at the height of the Cold War to deal with a numerically superior adversary. The first SEAWOLF will go to sea in a few months. SEAWOLF will be a highly capable ship, but more robust than we can afford in the numbers we will need to build. The Navy's FY 1997 budget request includes funds to continue work on the third SEAWOLF (SSN-23), already two-thirds funded, providing a shipbuilding "bridge" until construction of the initial New Attack Submarine commences. While only three of these formidable warships will be built, the enduring value of the program is the technology investment which significantly advanced the state of undersea warfare expertise for this country.

The New Attack Submarine -- Formidable and Affordable

The New Attack Submarine will have SEAWOLF- level quieting, be technologically robust and more affordable. In short, this will be a formidable ship meeting all military requirements -- but built using simplified, revolutionary design and construction techniques to cut costs.

The entire submarine design and construction process has been revolutionized for the New Attack Submarine. Specifically, design/build teams have been assembled incorporating the best talent from all areas including designers, ship construction trades, fleet operators, component suppliers, and fleet maintenance activities. Aside from generating a design which will be the most modular, producible and economical to maintain, this intensive effort has resulted in a seamless design/build process where manufacturing data is incorporated directly into the design data base, eliminating separate efforts to translate design data into a form required for manufacturing. This process also is reducing the number of changes typically encountered during lead ship construction by identifying manufacturing problems during the design phase.

Overall, the New Attack Submarine economically incorporates substantial technology advances. Moreover, the design has features to reduce the cost of incorporating new technologies in the future to enhance mission effectiveness. Once in serial production, we plan to build these ships for about the same cost as a new LOS ANGELES Class submarine -- tomorrow's technology at yesterday's price.

providing for future ships. Efforts include:

- Implemented the Navy's decision to close two of the six nuclear capable Naval shipyards, and greatly downsize the remaining four. Release of the two shutdown shipyards, Charleston and Mare Island, from Program radiological controls for general use will be complete at the end of this month at a cost of about $120 million each. This low cost is a bargain in the business of environmental remediation and reflects the careful attention the Program has applied through the years to the proper management of radioactive materials. One of the key tenants of the Program since inception is a very thorough, continuous radiological survey program to identify radiological contamination pursuant to operations or maintenance. We have not allowed liabilities to accumulate.

- Closed down the backup Naval fuel factory at the DOE Savannah River site. We now have only one commercial fuel supplier.

- Stopped production of highly enriched uranium The Program will use uranium returned from weapons stockpile reductions in the future.

- Recommended reprocessing of naval spent fuel cease and worked to have this action accepted by the Department of Energy.

- Reduced to one nuclear core supplier and one supplier for heavy nuclear equipment. Although we lose the benefit of competition, this is the most economical arrangement given the low volume of work anticipated.

- Shut down six of the Program's eight test reactors -- the sixth was shut down three weeks ago Along the way, we replaced two of them with decommissioned submarines to use for training Adapting the decommissioned submarines cost an average of $230 million vice several billion dollars for a new land based test reactor. We are proceeding with inactivation of the six shutdown test reactors, which will take several more years.

- Reduced the two Program laboratories, Bettis Atomic Power Laboratory and Knolls Atomic Power Laboratory, to the lowest staffing levels since the 1950's. The labs have always been relatively small, Bettis and Knolls combined have 5,890 employees, which is comparable to the smallest Department of Energy weapons laboratory.

So far, we have come through downsizing in a controlled fashion As with the growing significance of each ship, the smaller infrastructure means each facility and supplier becomes more valuable -- there is little leeway in case of problems.

The people in the Program have maintained their quality of our work and sense of mission While the number of jobs is down substantially, we have minimized personnel disruption through careful pacing -- to the maximum extent practical allowing cutbacks to occur through attrition We also

Focusing on my area of responsibility, the propulsion plant, we will achieve SEAWOLF level quieting more economically and in a much smaller volume -- 25% less than a SEAWOLF Class SSN. This reverses the trend to larger size to accommodate necessary quieting means. Besides being smaller in size, the plant is much simpler and easier to build -- 30% fewer construction hours than for SEAWOLF and 20% fewer than for an improved LOS ANGELES class submarine.

We can reduce construction time because of fewer components, new quieting techniques, streamlined specifications, simpler radiation shielding and large deck structures, which allow more efficient assembly of plant components and systems. The plant includes the first solid state electric power distribution system, and a new concept steam generator -- the key component transferring the reactor's power to the turbines. Collectively, these features simplify the plant and, as importantly, materially reduce lifetime maintenance cost.

Of special note, the plant is the first designed for a life-of-the-ship core -- 33 years of fuel comes with the purchase price. This continues our advance in core lifetime -- the NAUTILUS purchase price 40 years ago included only two years of fuel.

We have placed the contracts and work is underway on the propulsion plant for the lead ship and some long lead items for the second ship. I look forward to full lead ship authorization in FY 1998.

AIRCRAFT CARRIER DEVELOPMENT AND BUILDING

We continue to support construction and development of nuclear powered aircraft carriers. I participated in the highly successful propulsion plant trials of the seventh NIMITZ Class aircraft carrier, USS JOHN C. STENNIS (CVN-74), which Newport News Shipbuilding delivered last November. The eighth and ninth NIMITZ Class carriers, HARRY S TRUMAN (CVN-75) and RONALD REAGAN (CVN-76), are under construction with deliveries expected in 1998 and 2002, respectively. If CVN-77, the tenth and possibly last NIMITZ Class carrier is approved and funded, we plan to pursue propulsion plant improvements such as solid state electronic controls and instrumentation, mechanical component changes and control station rearrangements to further enhance reliability and to reduce manning and maintenance costs. These improvements are in keeping with the Navy's approach of incorporating transitional technologies possibly beneficial to a future new class of carrier, the CVX-78, currently under study. We are participating in the CVX-78 study to ensure that the preeminent warfighting value of nuclear propulsion is properly evaluated.

DOWNSIZING THE INFRASTRUCTURE

I have focused on how we have reduced the number of operating nuclear powered warships. In parallel, we have aggressively reduced the infrastructure supporting nuclear powered ships and

The Navy's strategic deterrent force -- today consisting solely of TRIDENT nuclear powered, ballistic missile submarines -- is the most survivable and cost effective part of the Nation's strategic triad according to a 1993 GAO review. These stealthy ships and their predecessors, the POLARIS submarines, hidden in the safety of the oceans, helped prevent nuclear war and bring a close to the Cold War. Though the threat of nuclear war has diminished greatly, the potential still exists -- several nations possess nuclear weapons and the means to deliver them and the capability is spreading. The fact that several TRIDENTS are constantly on patrol must give pause to any potential aggressor.

When crisis threatens, the Navy's nuclear powered attack submarines typically are the first U.S. forces to arrive on scene -- and the last to leave. They reconnoiter, secure the area for surface forces and, if necessary, can strike opposing naval forces or forces ashore.

Our nuclear powered submarines offer particular advantage with today's worldwide satellite surveillance and highly accurate missiles. Submarines are stealthy, creating a terrible uncertainty for an opponent -- they may or may not be there. This, in effect, multiplies their numbers and the difficulty an opponent faces in dealing with them. Submarines are self sufficient -- they don't need escorts and can operate alone in hostile areas. Submarines use the ocean to their advantage -- the ocean depths are their primary defensive means, eliminating the need for expensive self defense weapons. They require only a very small crew. And submarines are highly versatile -- playing in essentially all key Navy mission requirements. Taken together, these advantages mean nuclear powered submarines deliver a large return for their investment.

Potential Submarine Threats

Today we are seeing a leaner, more capable Russian submarine force whose scope of operations once again is expanding. Since I last met with you, Russian submarines cruised off both coasts for the first time in eight years. Of more significance, they continue an aggressive submarine research and development program -- their premier defense development effort according to a 1993 statement by the Russian Defense Minister.

While only five countries now have nuclear powered submarines, submarine technology is proliferating worldwide. There is a growing realization that even diesel submarines allow smaller countries to exert sea control for a reasonable investment.

Submarine Quieting

Last year the Navy noted the Russians have six Improved AKULA-class submarines, their newest ships, which are as quiet as our submarines at low speed. This has been taken to mean these ships are better than our latest and has caused, to some degree, a hue and cry over the Navy having lost the acoustic lead over the Russians. This is not correct. Our current improved LOS ANGELES Class submarines still have an overall acoustic advantage.

have used early retirement and buyouts as incentives to encourage workers to leave .

SPENT NUCLEAR FUEL

To ensure the Navy's ability to service nuclear powered warships, we must be able to deal with spent nuclear fuel. As I noted, one result of downsizing was stopping spent fuel reprocessing The State of Idaho's subsequent concern over the ultimate disposition of spent nuclear fuel at the DOE's Idaho National Engineering Laboratory led to the stoppage of such shipments to Program facilities in the state for examination and subsequent temporary storage. With Congress' strong support, we reached agreement with the State of Idaho this past October to resume shipments, alleviating a serious and rapidly deteriorating situation for the Navy. We have a solid 40 year agreement with the state of Idaho -- beneficial to both sides.

SAFETY, RELIABILITY AND THE ENVIRONMENT

Of necessity, a primary focus has been to assure the safety and reliability of the operating reactor plants -- numbering 130 today, compared to 109 civilian nuclear power plants. This was the case for my predecessors and will be for my successor. Absent an excellent record, the Navy would not be able to use nuclear powered ships. We have never had a Naval reactor accident or a significant release of radioactivity to the environment. This is testimony to the skill and dedication of the people who serve in our nuclear powered ships and the Naval Nuclear Propulsion Program.

As a benchmark, the Navy's 4,600 reactor years of operation compare to 2,100 for U.S. commercial nuclear power plants and a worldwide commercial nuclear total of about 5,000. In terms more applicable to the Navy, nuclear powered warships have now steamed over 106 million miles -- about 3 million miles in the past year alone.

As usual, I have attached our annual reports on radiological environmental monitoring, worker radiation exposure, and occupational safety and health. These reports continue to demonstrate the Program's exceptional record in protecting the environment and the public while minimizing radiation exposure to people in the Program. This marks the 31st year we have published public radiological reports.

WHAT MAKES THE NAVAL NUCLEAR PROPULSION PROGRAM TICK?

As this likely is my last appearance before the committee, I would like to reflect on what has made this Program successful and given us the flexibility to adapt so well to changing conditions.

Focused Mission and the Wherewithal to Carry it Out

Foremost, we have a clear, focused mission defined in Executive Order 12344. We have full responsibility for nuclear propulsion plants from their inception to their disposal, i.e., responsibility for the design, construction, operation, operator-training, maintenance, and disposal of reactor plants, plus reactor safety, radiological control, and related environmental and health matters. The executive order, and the provision in Public Law 98-525 (42 U.S.C. 7158) which codifies it, cement our authority to carry out these responsibilities.

The joint program arrangement -- assignment to both the Navy and Energy Departments -- provides the independence needed to carry out work necessary to assure the reliability of operating and future reactor plants, enforce high standards and ensure safety, which are crucial to sustaining the safety record of the Navy's nuclear powered warships -- a record which must be maintained if these ships are to continue their important defense contribution.

The Program's current structure and authority enables us to deal with other agencies, the states and, in particular, foreign governments. Giving independent assurances concerning reactor plant safety is vital to obtaining permission for the Navy's nuclear powered warships to enter foreign territorial waters and ports -- an important factor in carrying out the Navy's worldwide mission.

The Naval Reactors Organization

Naval Reactors is a lean organization attuned to technical, environmental and safety needs -- as well as policy and management matters. People come to the Program and stay. Knowing we have a long term commitment as an organization and as individuals causes a high sense of responsibility We always have had a flat organizational arrangement to facilitate reporting, solving and preventing problems. We used to be harassed for this arrangement, now our approach is in vogue. With numerous operating plants there are always problems -- the trick is to catch them, deal with them when they are small, and learn from them. The seniority of the director reinforces the objectivity and independence needed for engineering and safety decisions.

We commingle R&D and operational responsibilities within our technical groups -- we believe the combination benefits both areas. Our people know they will have to maintain what they design, and they have the practical experience to apply to development efforts.

The Job Isn't Easy

Success often belies the view that a job is easy. This is not the case. Nuclear energy is a powerful and, unfortunately, unforgiving technology. Naval Reactors is responsible for 20% more reactors than the entire U.S. commercial nuclear power generating industry (130 vs. 109), and almost the same number as the next three largest commercial nuclear power generating nations in the world combined (France, Japan, and the United Kingdom). Running a program of this magnitude is not a routine process. Success requires constant technical vigilance -- and continuous analysis, testing, and monitoring of reactor plant and core performance.

Accidents such as Three Mile Island, Chernobyl, nuclear mishaps on Soviet nuclear powered ships, and the vast environmental problems resulting from other nuclear programs show the intolerable consequences if vigilance fails or impediments exist to doing the job right the first time We work at not becoming complacent due to our past excellent record.

Congressional Support

The Program's broad responsibility for nuclear propulsion, authority to carry out that responsibility, and assignment to two agencies -- in short the underpinnings of the Naval Nuclear Propulsion Program -- result from the active support and involvement of Congress since the inception of the Program. This Congressional involvement has been and continues to prove vital to the fulfillment of the Program's mission.

SUMMARY

Please accept my heartfelt thanks for your wholehearted support of the Naval Nuclear Propulsion Program since inception. Without your backing, we could not have succeeded in having a program of unique technical discipline and accomplishment. I believe the safe effective application of nuclear propulsion to over 40% of the Navy's combatants was a considerable factor in successfully bringing the Cold War to an end and now toward maintaining peace -- a benefit to all humanity. Thank you.

Attached is a discussion of my FY 1997 DOE budget request.

FY 1997 BUDGET REQUEST

Naval Reactors' FY 1997 budget request of $663.9 million is three percent (six percent in real dollar terms) less than the FY 1996 enacted amount. First priority remains supporting the more than 120 operating reactors in the fleet and development of the reactor plant for the Navy's New Attack Submarine.

In order to continue fully supporting this mission as well as help balance the budget, Naval Reactors as noted above has undertaken aggressive cost cutting measures including shutting down six of eight land based test reactor plants. Though shutting down these plants creates a substantial long term cost savings, an obligation exists to responsibly inactivate them. The FY 1997 budget request will allow us to continue inactivation work but cause us to prioritize that work to ensure the most vital activities can be accomplished.

DEVELOPMENT AND SUPPORT OF OPERATING REACTORS

In aggregate, Reactor Technology & Analysis and Plant Technology decrease by eight percent from FY 1996 principally due to progress on test components for next generation reactor and new concept steam generator development. This technology, intended primarily for the Navy's New Attack Submarine class, will also benefit future reactor plant development and improvements to existing plants. The decrease in reactor and plant technology efforts is partially offset by an increase in Materials Development & Verification efforts necessary to determine material performance in the harsh reactor plant environment over the extended lifetimes envisioned for the latest ship classes.

Nuclear propulsion is a demanding technology -- the environment within a reactor plant subjects components and materials to the effects of irradiation, corrosion, high temperature and pressure over a number of decades. Naval reactor plants must be even more rugged and resilient than commercial nuclear power plants, as well as be easily maintainable for the sailors who live next to the reactor plants. Naval plants must be able to accommodate ships' pitching and rolling, rapidly-changing demands for power, and increased loads on components due to shock-- possibly under battle conditions.

In order to address these needs and ensure safe and reliable plant performance over their long operating lifetime (up to 45 years for carriers), Naval Reactors carries out integrated analytical, testing and development efforts. Major foci of these efforts include: developing, qualifying and testing core and plant materials such as silicon carbides capable of maintaining their structural/mechanical integrity over decades in a high temperature, high pressure, corrosive environment; improving inspection and prediction methods for material corrosion performance and cracking resistance; developing methods to reduce performance-impairing corrosion product deposits and radiation level buildup, such as minimizing fluid system impurities and long-lived radionuclides and assessing improved water chemistries; examining expended cores and irradiated material specimens to compare their performance against design predictions, which will support decisions regarding operating plants and enable improved models and analytical techniques in the future; and analyzing nuclear, thermal-hydraulic, structural, and fluid-mechanical data measured in both prototypic test components and operating plants to better understand and predict plant performance for use in future reactor designs.

Naval Reactors also is developing new designs and manufacturing processes which will result in more cost-effective and higher-performance reactor components including cores, reactor structures, and control rod drive mechanisms, while achieving longer operational lifetimes and enhanced reliability; developing plant components such as the new concept steam generator, with improved corrosion resistance, greater plant design flexibility and efficiency, and reduced life-cycle costs; and developing instrumentation and control systems for reactor plants by incorporating state-of-the-art microprocessor and solid-state technologies into sensors, indication, and control equipment in existing and future plants.

The $162.1 million for Evaluation and Servicing (up 4 percent) funds the operation, servicing, and inactivating of land-based test reactor plants and the operation of the advanced test reactor, a specialized materials testing facility. Testing of materials, components, cores and systems in these plants provides important technical data and experience under actual operating conditions, and allows potential problems to be identified and addressed before they occur in the fleet. For example, the advanced fleet reactor -- designed for the SEAWOLF class attack submarine -- has accumulated the equivalent of over seven years of operation in advance of the lead ship going to sea later this year.

The increased sophistication of computer models and the accumulation of operational data, along with the decrease in the number of Navy plant operators needed, have allowed us to shut down six of the eight test reactor plants. As previously mentioned, though this will result in a substantial cost savings, full realization of the savings is dependent upon completion of a multi-year inactivation effort. This work, which began in 1993, is progressing well; fuel has been removed from three plants and extensive dismantlement and disposal has been accomplished. The funds requested in FY 1997 will allow high priority inactivation work to proceed.

The two remaining test reactor plants, with proper maintenance and servicing, will be adequate to meet testing needs for some time.

To maintain the Program's excellent environmental and safety record, Naval Reactors will continue to pay close attention to environmental compliance and monitoring programs as well as to upkeep of our laboratory facilities.

PROGRAM INFRASTRUCTURE

The $18.9 million in Program Direction funding will cover Naval Reactors' 209 DOE personnel at headquarters, the Program's field offices, and the Idaho Operations Office, including salaries, benefits, travel, and other expenses. This staff maintains oversight of the Program's extensive day-to-day technical and administrative operations, while continuing to ensure compliance with growing environmental, safety, and other regulatory requirements, which -- notwithstanding our excellent record -- necessitate substantial effort.

The $43.0 million in Capital Equipment (level with FY 96) will maintain and modernize the Program's facilities, including the Bettis and Knolls laboratories, the Expended Core Facility, and the Advanced Test Reactor facility. Procuring massively parallel computers instead of conventional supercomputers will meet the increased computing power needs for nuclear design/analysis while achieving substantial savings. Not only are they less costly, they can be progressively upgraded as computing demands grow. Other major procurements include: irradiated test specimen transfer casks; thermal-hydraulic test equipment to improve understanding of reactor fluid dynamics; corrosion and chemistry test equipment; and materials examination equipment for post-irradiations materials evaluations.

Construction funding, $13.7 million (down 40 percent), principally provides for maintenance, refurbishment, and replacement of the Program's aging facilities. This includes continuation of two major construction projects (the Laboratory Systems and Hot Cell Upgrades and the Expended Core Facility Dry Cell), the final increment of the Advanced Test Reactor Radioactive Waste System Upgrades, and one new start, the Advanced Test Reactor Secondary Coolant System Refurbishment. The FY 1997 request also includes the baseload of general plant projects of $8.2 million. Overall, investment in these various projects will extend the lives and improve the efficiency of the Program's facilities.

STATISTICS OF THE NAVAL NUCLEAR PROPULSION PROGRAM **19 FEBRUARY 1996**

o Number of Reactors in operation	131
• Nuclear powered submarines	96 (5 more under construction)
• Nuclear powered carriers	8 (2 more under construction)
• Nuclear powered cruisers	4
• Training Platforms	5
o Number of reactor years of safe operation	over 4600
o Number of miles steamed (all nuclear ships)	over 100 million miles
o Core Endurance	
- 1st submarine core	62,000 miles
- latest submarine core	1,000,000 miles
- latest CVN cores	1,000,000 miles
o Number of shipyards doing nuclear work	6 (4 naval - 2 private)
• Number of cores refueled/defueled	340

- Number of personnel trained and in training to date: Officers - over 16,000 Enlisted - over 78,000

- In the forty two years of the Naval Nuclear Propulsion program since the NAUTILUS land-based prototype first operated there has never been an accident involving a naval reactor nor has there been any release of radioactivity which has had a significant effect on the environment.

- During 1995 the total gamma radioactivity in liquids discharged within 12 miles of shore from all nuclear powered ships, supporting tenders, naval bases and shipyards was less than .002 curie.

- Laboratory FY 1996 Employment Levels Bettis - 3,053 KAPL - 2,837

- Industry Participation: Over 625 industrial contractors provide components and equipment.

NAVAL REACTORS: A SAFE, LEAN OPERATING PROGRAM

Nuclear energy is an unforgiving technology requiring a significant effort to ensure the performance and safety of Naval nuclear propulsion plants.

OPERATIONS

- 131 Naval reactors vs 109 civilian power reactors
- 4600 reactor years of operation vs:
  - o 2100 -- U.S. Civilian reactor years
  - o 5000 -- Rest of world civilian reactor years
- 9 reactors / 7 ships under construction
- Developing reactor plant for new class of submarines

HIGH PUBLIC CONFIDENCE

- Navy allowed to berth nuclear powered ships in populated ports
- U.S. nuclear powered ships visit over 150 foreign ports
- New Zealand Government Commission Report -- likelihood of any damaging emission or discharge of radioactive material is so remote it cannot give rise to any rational apprehension.
- Volunteers willing to serve / viewed as prestigious work
- Congressional provisions to recognize and ensure viability
- Maintain public confidence despite negative view of other nuclear programs.

BASIS FOR CONFIDENCE -- **WORLD CLASS** safety

- Over 100 million miles steamed, world-wide presence, Presidential recognition
- Less than .002 Curie discharge in ports and harbors
- Radiation exposures much lower than federal limits
- Total environmental releases much less than individual civilian plants
- No NR sites qualify for Superfund
- High marks from independent reviews by EPA and States
- Clean bill of health by GAO

LEAN

- 40% of Navy's combatants
- 4% of DOE budget, 6% of DOE defense activities; 1% of DOE staff
- Bettis/KAPL combined comparable in size to smallest weapons lab

AGGRESSIVELY SHRINKING

- NR'S DOE budget declines 30% from 1992 to 1997 (constant $)
- Closing or closed:
  - o Savannah River Naval fuel plant
  - o Last of reactor critical facilities
  - o 6 of 8 reactor prototype facilities
  - o Half of irradiated materials testing
- Laboratory staffing decreases 28% from its peak
- Prompted national policy decisions to:
  - o Stop HEU enrichment -- Portsmouth Facility
  - o Stop reprocessing -- Idaho Chemical Processing Plant

Naval Reactors' Budget Reduction Measures

- **NR recognized early the need to streamline operations and aggressively pursue cost reductions both within the Program and in other related areas within DOE:**

Reductions:

- shut down S1W, S3G, S1C, A1W, S5G and D1G prototypes -- a 75% reduction over the decade;
- inactivated Savannah River Fuel Factory;
- consolidated core manufacturing at one lab and one vendor;
- shut down all of the Program's critical reactor test facilities;
- established use of surplus weapons HEU as fuel for Naval cores to allow shut down of enrichment facility;
- stopped Naval fuel reprocessing -- saving $100M+/yr beyond NR budget reductions.
- used existing prototype plant for testing Advanced Fleet Reactor vice constructing new prototype;
- cut in half use of the Advanced Test Reactor (ATR) test loops;
- streamlined ATR operations by eliminating lower priority work and through more cost-effective implementation of training, security, and safety programs;
- reduced capital and construction efforts 25%+ by slowing modernization and deleting next supercomputers;
- eliminated prototype plant testing of several new components, including the new concept steam generator;

Coming reductions:

- inactivate shutdown prototypes;
- eliminate site by completing Windsor Site inactivation;
- consolidate work/functions at Bettis or KAPL (e.g. closure of Bettis hot cells) and the Naval nuclear vendor base;
- more narrowly focus development work; e.g. evolve existing electronic equipment design vice ground-up development;

- NR has and will accomplish these reductions while:

  - already having absorbed inflation, environmental compliance, security and safeguard growth within a level budget; and

  - accommodating an extensive prototype plant inactivation effort and the substantial test hardware costs for new plant development, usually requiring a several year funding increase.

- **The reductions allow NR to reduce budgetary requirements from FY94-97 an average of $300M/year (30%) from the levels projected in 1992 budget and reduce laboratory staff to the lowest level since the 1950's (22% reduction over the decade from 7,050 in 1990 to 5,500 in 2000 -- 28% reduction from peak staffing).**

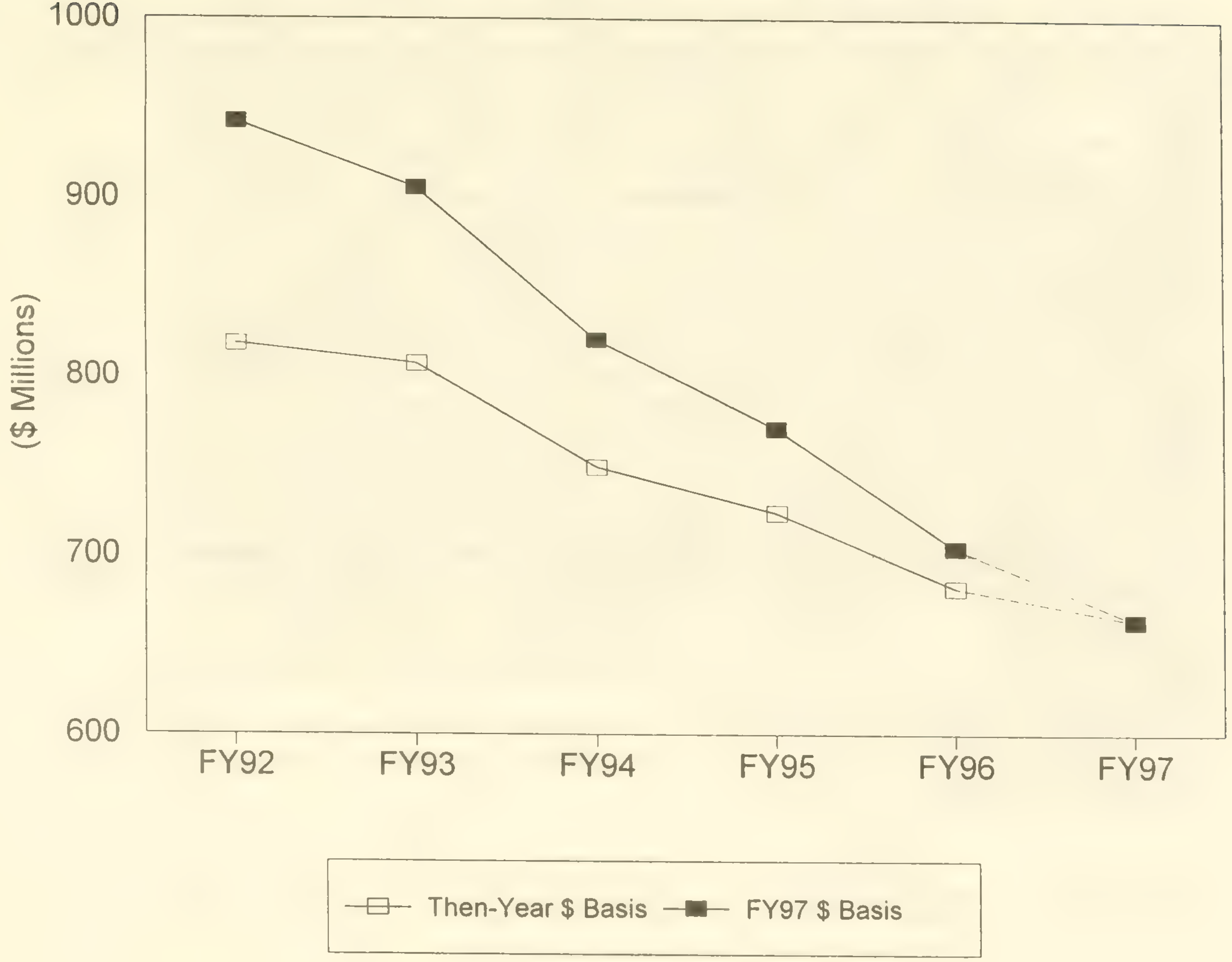
- **NR's environmental record also precludes the very expensive clean-up and damage to the Department's reputation occurring in other programs.**

IMPROVEMENTS TO NAVAL REACTORS DEVELOPMENT BUDGET STRUCTURE (KEY ACTIVITIES)

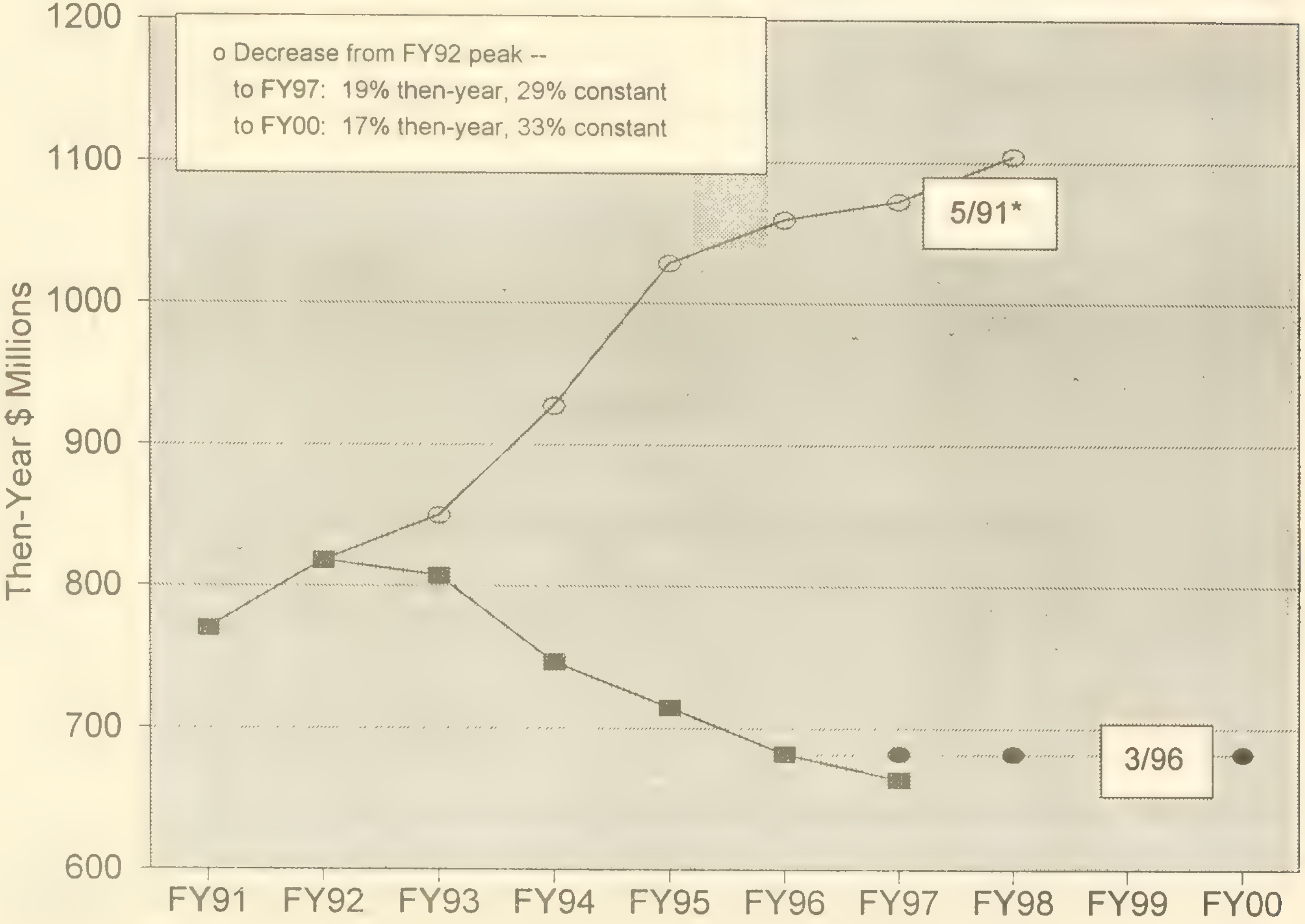
OLD CATEGORIES (thru FY96)	NEW CATEGORIES (FY97 & beyond)
Reactor Development ($327.9M)	
Materials Development ($95.0M)	· Materials Development & Verification ($110.0M)
Nuclear Design & Analysis ($50.0M)	
Reactor Technology Development ($182.9M)	· Reactor Technology & Analysis ($192.0M)
· Plant Development ($127.7M)	· Plant Technology ($116.0M)
· Reactor Operation & Evaluation ($135.5)	· Evaluation & Servicing ($162.1M)
Reactor Servicing & Refueling ($106.5M)	
Reactor Operation & Testing ($29.0M)	
· Program Direction ($18.5M)	· Program Direction ($18.9M)
· Capital Equipment ($43.0M)	· Capital Equipment ($43.0M)
· Construction ($29.6M)	· Construction ($21.9M)
TOTAL NAVAL REACTORS DEVELOPMENT $682.2M	**TOTAL NAVAL REACTORS DEVELOPMENT $663.9M**

- Old categories in use since 1980; simpler, updated structure needed as budgets decline
- Revised titles more accurately reflect today's and tomorrow's efforts
- Strikes better balance and consistent level of detail between categories
- Reflects changing emphases in program priorities
  - Materials efforts becoming increasingly important as age of nuclear fleet increases (some ships will be in operation for 40-50 years); better, more corrosion- and stress-resistant materials needed for future plants
  - As 6 of 8 land-based prototype plants are shut down, less emphasis placed on prototype operations/refuelings, more on the significant servicing effort required to defuel/inactivate them, Evaluation & Servicing category would also expand to include operation & maintenance of the Advanced Test Reactor, and prototype expended core examinations

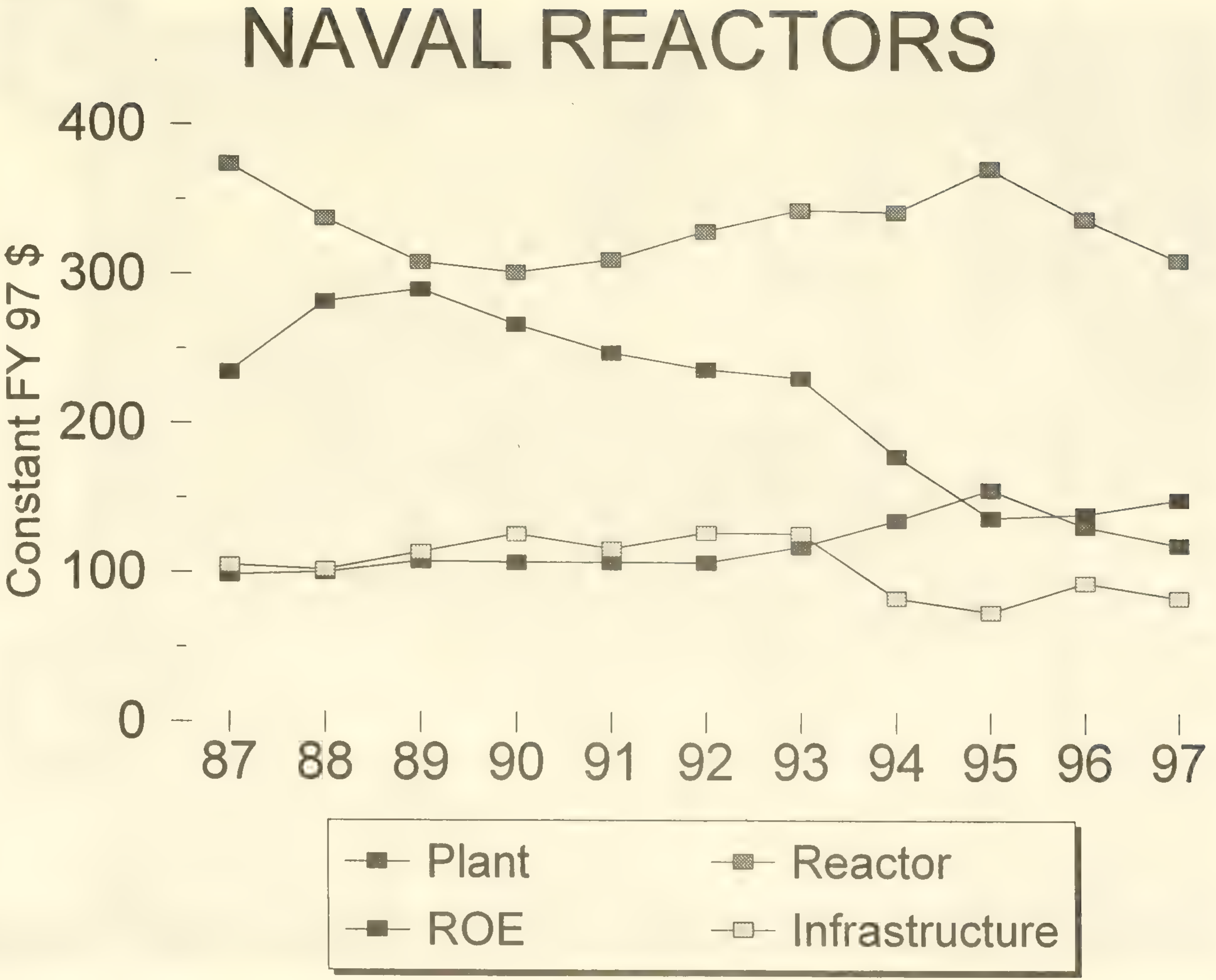
NAVAL REACTORS' BUDGET



NR'S DOE BUDGET PROJECTIONS



o Decrease from FY92 peak --
to FY97: 19% then-year, 29% constant
to FY00: 17% then-year, 33% constant

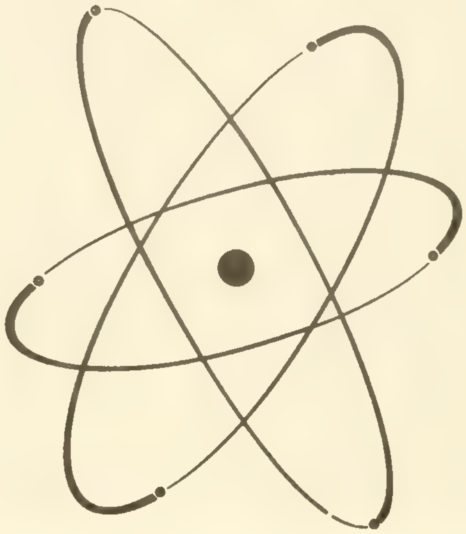


NAVAL REACTORS

THE UNITED STATES NAVAL NUCLEAR PROPULSION PROGRAM

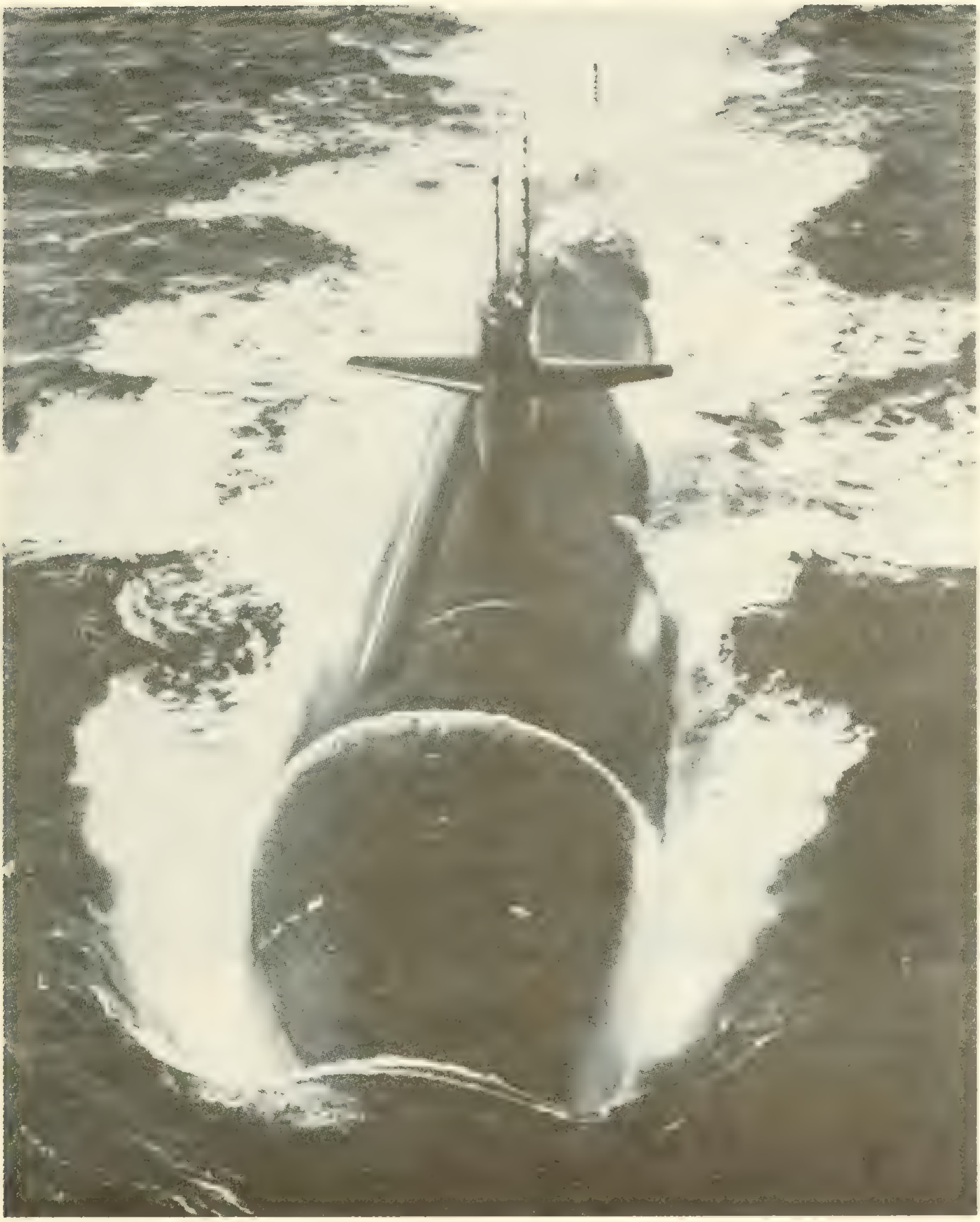
JUNE 1995

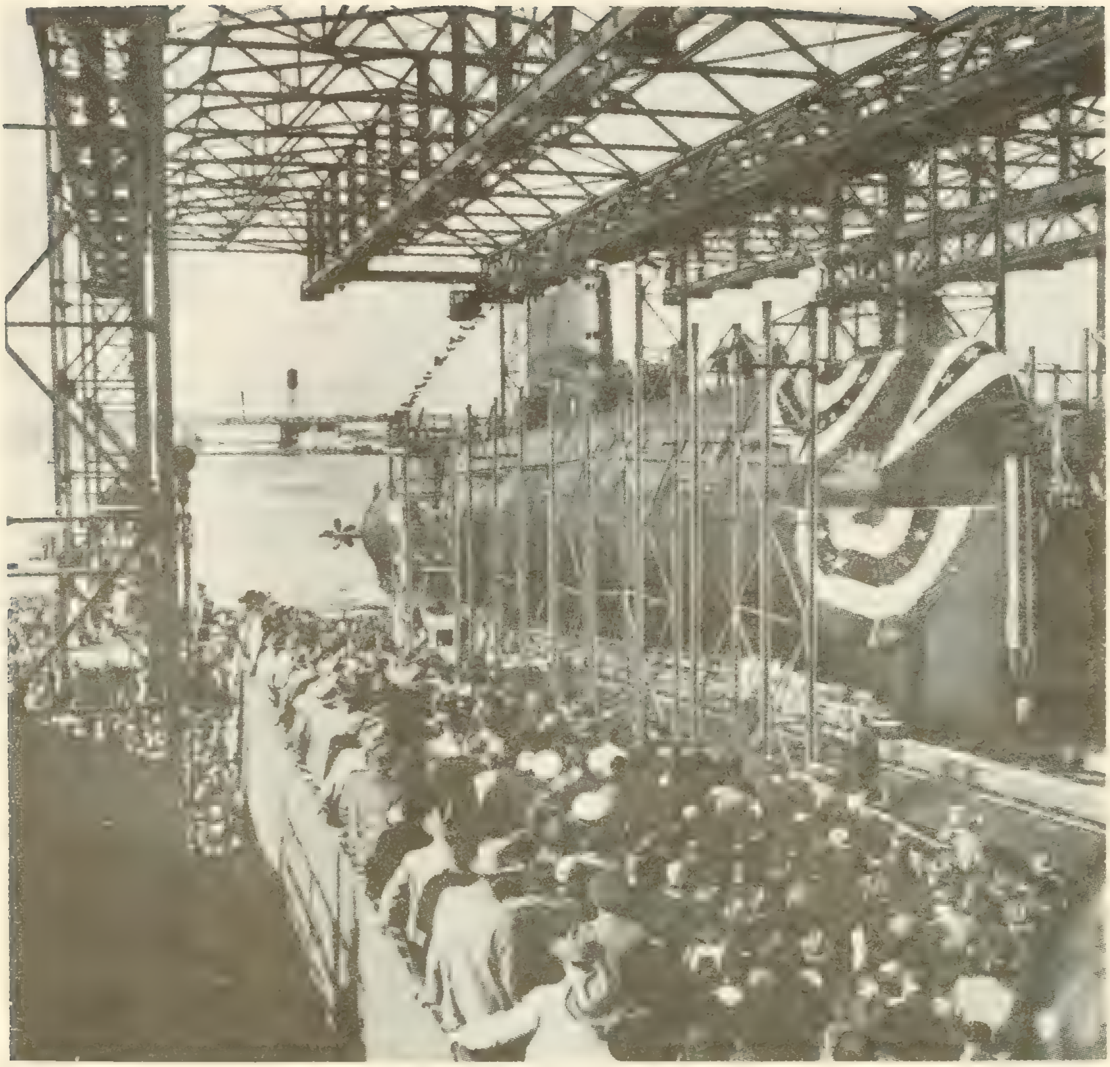
Over 100 Million Miles
Safely Steamed on Nuclear Power



U.S. DEPARTMENT
OF ENERGY

U.S. DEPARTMENT
OF DEFENSE





USS NAUTILUS Launching Ceremony

DEPARTMENT OF ENERGY UNITED STATES OF AMERICA

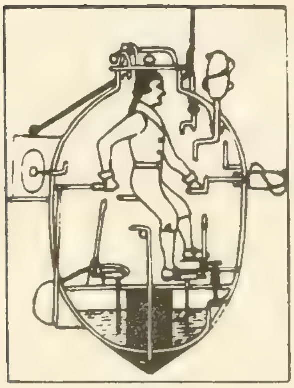
DEPARTMENT OF DEFENSE UNITED STATES OF AMERICA

INTRODUCTION

On January 17, 1955, USS NAUTILUS (SSN 571) put to sea for the first time, signaling her historic message: "Underway on nuclear power." Naval warfare would never again be the same.

The development of the nuclear propulsion plant, the cause of this revolution in warfare, was the work of a team of Navy, government, and contractor engineers led by Captain Hyman G. Rickover. Starting from scratch only eight years earlier, he obtained Congressional support to develop an industrial base in a new technology, pioneer new materials, design, build, and operate a prototype reactor, establish a training program, and take a nuclear-powered submarine to sea. The success and speed of this development has given America undersea and nuclear propulsion superiority ever since.

For more than 35 years, Admiral Rickover headed the Naval Nuclear Propulsion Program. Upon retirement in 1982, he left behind a tradition of technical excellence and an organization staffed by experienced professionals dedicated to designing, building, and operating Naval nuclear propulsion plants safely and in a manner that protects people and the environment—legacies continued by his successors. The result is a fleet of nuclear-powered warships unparalleled in capability, and a mature, highly disciplined infrastructure of government and private activities.



Bushnell's Turtle

ADVANTAGES OF NAVAL NUCLEAR POWER

Before the advent of nuclear power, the submarine was, in reality, a small surface ship that could submerge for only short periods of time. As it required oxygen as well as fossil fuel to operate its diesel engines, the submarine had to draw in air and exhaust combustion products. This required the submarine either to be on the surface, or close enough to the surface to use a snorkel, which made the ship susceptible to detection. To avoid detection, the ship had to submerge fully and rely on electric batteries which depleted within several hours. The ship would then have to surface again to start the diesel and recharge the batteries.

Diesel Submarine USS BARRACUDA (SST 3)

By eliminating altogether the need for oxygen for propulsion, nuclear power offered a way to drive a submerged submarine at high speeds without concern for fuel consumption; to operate fully capable sensors and weapons systems during extended deployments; and to support a safe and comfortable living environment for the crew. Only a nuclear-powered submarine can operate anywhere in the world's oceans, including under the polar ice, undetected and at maximum capability for extended periods.

USS PINTADO (SSN 672) at the North Pole

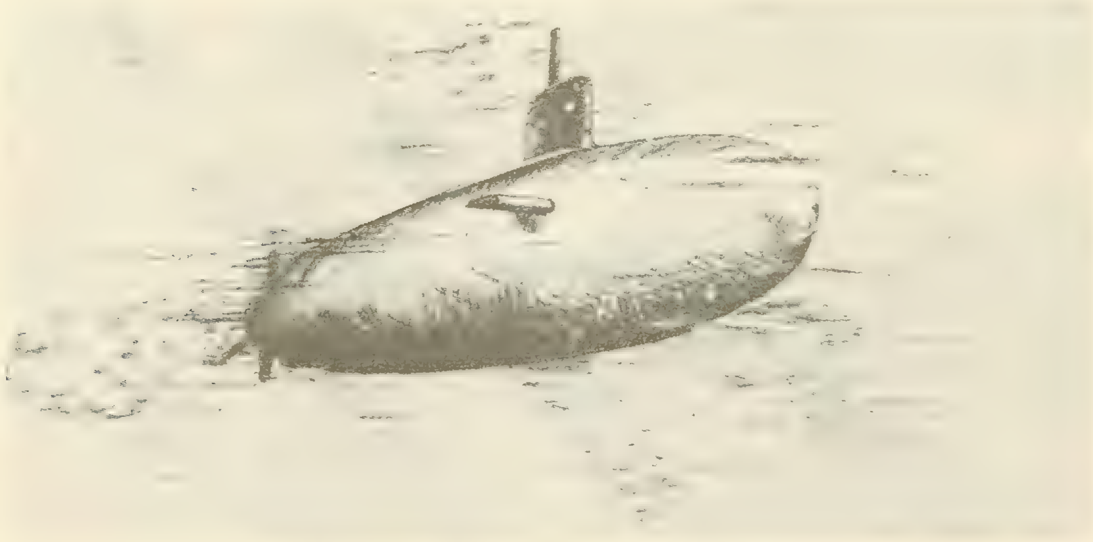
Nuclear propulsion, though originally developed for submarines, significantly enhances the military capability of surface ships. Mobility and security of fuel supplies are among a fleet commander's greatest concerns. Nuclear propulsion overcomes these problems by providing virtually unlimited high-speed endurance without dependence on tankers and their escorts. Moreover, space normally required for propulsion fuel in oil-fired ships provides increased storage capacity for weapons and aircraft fuel in nuclear-powered ships.

The advantage of nuclear-powered surface ships is multiplied many times when an entire carrier battle group consists of a nuclear-powered aircraft carrier plus nuclear-powered escorts. Such an all nuclear battle group enjoys a significant speed, endurance, and tactical advantage over conventionally powered counterparts. It can respond to crises more quickly and stay on station far longer.

TODAY'S MISSION

USS PATRICK HENRY (SSBN 599) on Sea Trials in Long Island Sound

Submarines For over three decades, U.S. ballistic missile submarines have provided strategic deterrence and represent the most invulnerable of our strategic forces. Successive classes of ever more capable U.S. attack submarines have ensured a warfighting edge over any potential adversary. The SEAWOLF submarine, with stealth, tactical speed, and advanced combat systems, will be the most capable submarine in the world. Incorporating this technology into future classes of submarines will allow the



SEAWOLF (SSN 21) (Artist's Conception)

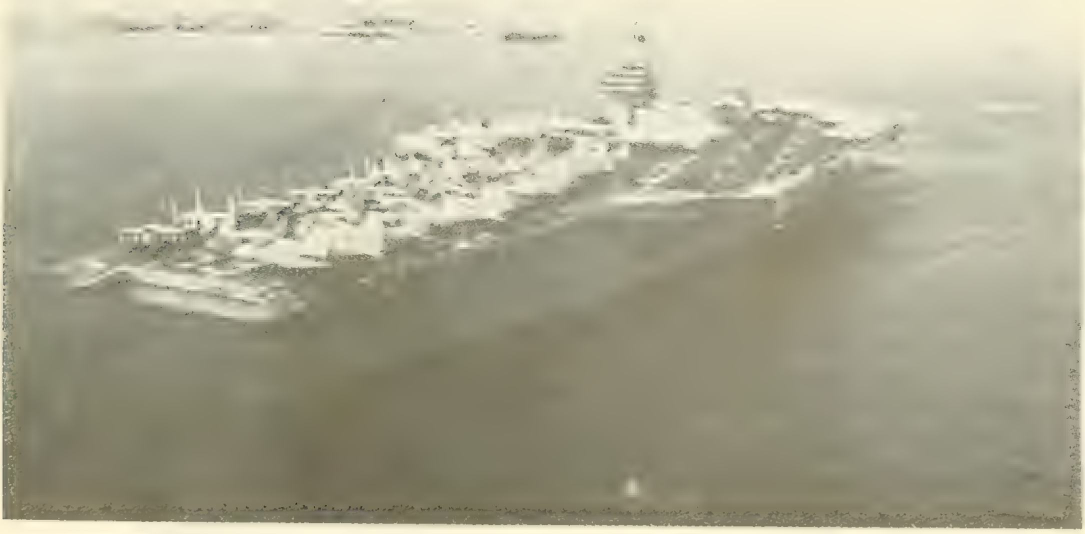
U. S. to maintain undersea superiority and control of the seas in the face of any future threats, regardless of national or international economic or political stability.

Of increasing concern to national security and the military balance in regional areas is the number of countries that are seeking or have obtained nuclear-powered submarines and nuclear weapons technology. The superior stealth, mobility, and firepower of our nuclear attack submarines, however, enable the United States to combat these threats. With fewer bases overseas and declining fleet assets, these warships represent a stealthy, far-reaching force that will be able to shoulder a significant defense burden, even in low-intensity conflicts.

Nuclear-powered submarines are cost-effective platforms uniquely suited to defend the sea lanes, protect carrier battle groups, reach points of conflict quickly and undetected, and engage in offensive operations off an enemy's coast or even against inland targets.

Surface Ships With added tactical advantages, U.S. nuclear-powered aircraft carriers and cruisers are a visible and powerful means of projecting military force around the globe.

With their independence from oil resupply, nuclear-powered surface ships can respond quickly and remain on station for extended periods of time in forward positions where military power is needed with minimum risk to support units.



USS DWIGHT D. EISENHOWER (CVN 69) off Athens, Greece

WHAT IS THE NAVAL NUCLEAR PROPULSION PROGRAM?

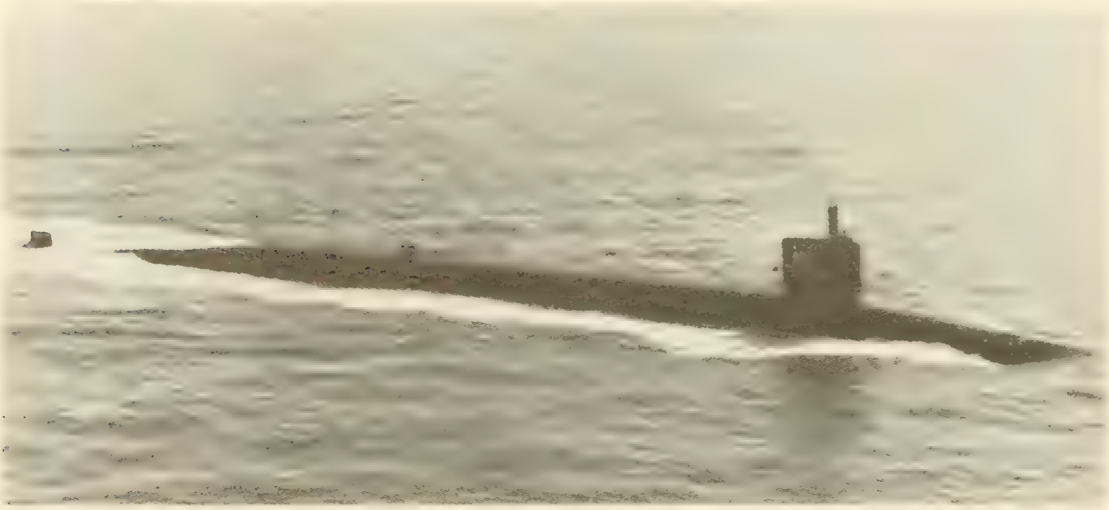
The Naval Nuclear Propulsion Program is comprised of military personnel and civilians who design, build, operate, maintain, and manage the nuclear-powered ships and the many facilities which support the U.S. nuclear-powered Naval fleet. The Program has a broad reach, maintaining responsibility for nuclear propulsion from cradle to grave. Program responsibilities are delineated in Presidential Executive Order 12344 of February 1, 1982, and prescribed by Public Law 98-525 of October 19, 1984 (42 U.S.C. 7158). Program elements include:

- The Navy's nuclear-powered warships;
- Research and development laboratories;
- Contractors responsible for the design, procurement, and construction of propulsion plant equipment;
- Shipyards that construct, overhaul, and service the propulsion plants of nuclear-powered vessels;
- Navy support facilities and tenders;
- Nuclear power schools and Naval Reactors training facilities; and
- The Naval Nuclear Propulsion Program Headquarters organization and field offices.

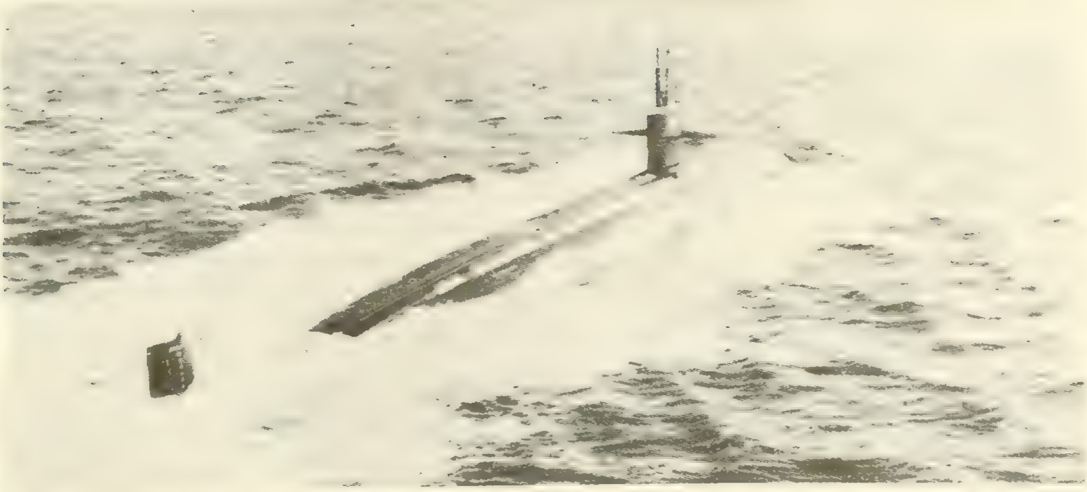
Nuclear-Powered Warships

Nuclear-powered warships comprise over 40 percent of the major U.S. combatants.

- **Ballistic missile (or "strategic")** submarines are virtually undetectable while submerged. They are the least vulnerable leg of the U.S. strategic deterrent force. Today's force is comprised of TRIDENT Ballistic Missile submarines, capable of carrying 24 TRIDENT missiles. At 560 feet in length and 18,700 tons displacement, the TRIDENT is the largest U.S. nuclear-powered submarine.



USS TENNESSEE (SSBN 734) in the Atlantic Ocean off the Georgia Coast



USS OKLAHOMA CITY (SSN 723)

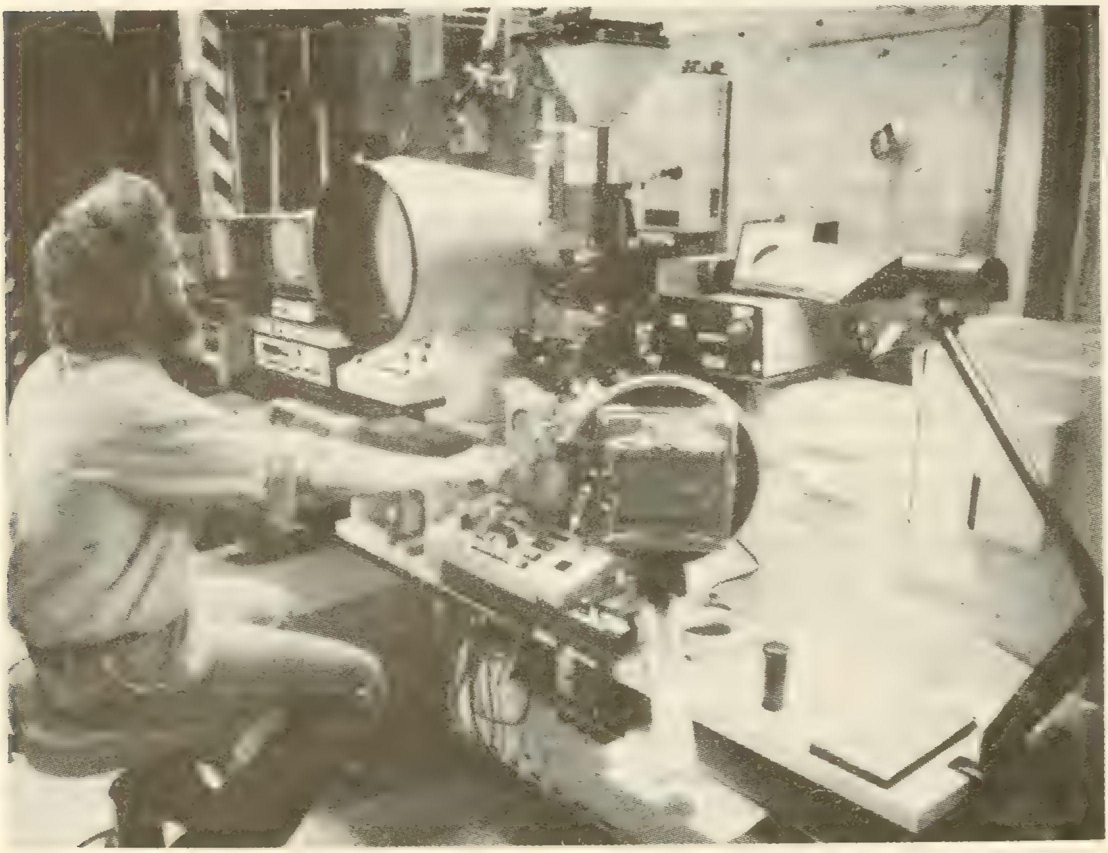
- **Attack submarines,** forward-deployed, alone and unsupported, can exert influence throughout the world's oceans—protecting vital commercial sea lanes, providing protection for our surface warships, and creating tactical uncertainty for an enemy who must tie up fleet units in defensive roles. These submarines operate virtually undetected in all the world's oceans, even under the ice of the harsh Arctic Ocean. Additionally, with submarines now capable of carrying cruise missiles, targets ashore are not immune from the reach of a submerged launch from these warships. Today's active attack submarine fleet consists of STURGEON Class submarines, which were the mainstay of the attack submarine fleet into the 1980's, and the newer, more advanced LOS ANGELES Class submarines which now represent the most advanced submarine technology at sea.

- **Nuclear-powered surface ships,** often the first to be sent to troublespots around the world, can remain on station indefinitely without refueling—a 150,000 gallon-per-day concern for conventionally powered carriers during routine operations. Today's active surface fleet consists of the USS ENTERPRISE, the first nuclear-powered aircraft carrier, six NIMITZ Class carriers, the largest warships in the world, and six nuclear-powered cruisers.

USS LONG BEACH (CGN 9) Underway in the Pacific Ocean

Research and Development Laboratories

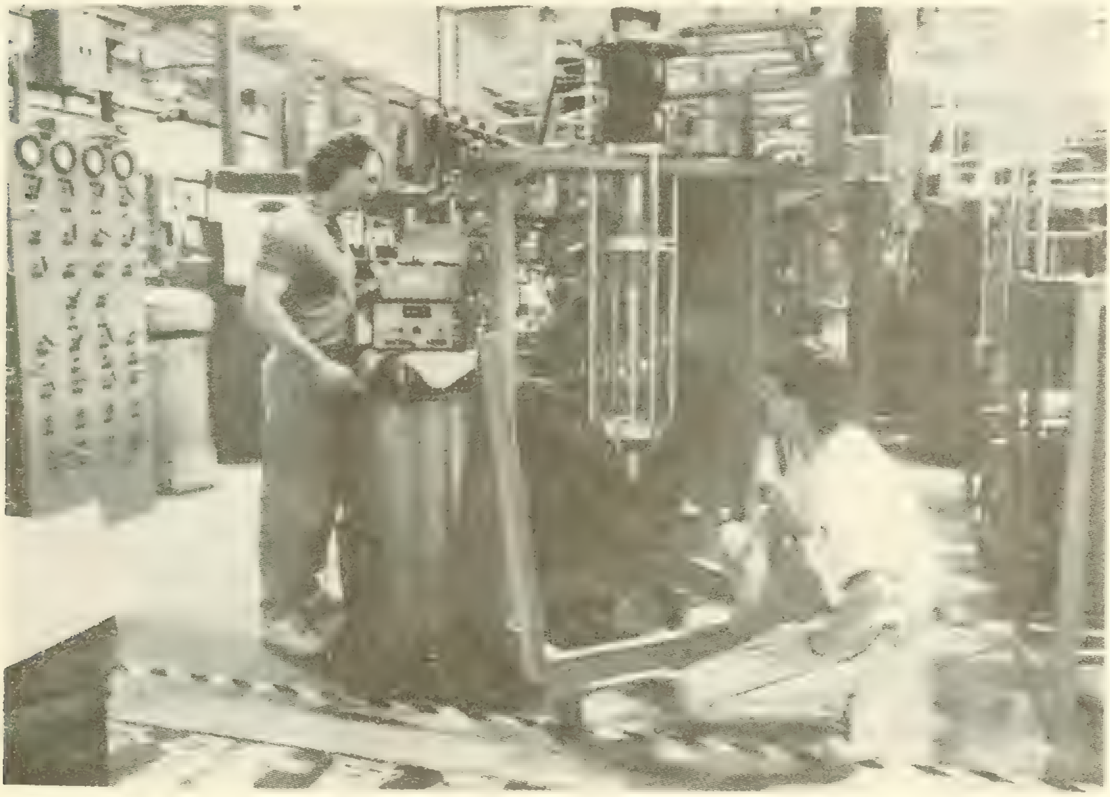
The Government-owned, contractor-operated Bettis and Knolls Atomic Power Laboratories are large research and engineering facilities devoted solely to Naval nuclear propulsion work. With combined staffs of over 6000 engineers, scientists, technicians and support personnel, their mission is to develop the most advanced Naval nuclear propulsion technology and to provide technical support for the continued safe, reliable operation of all existing Naval reactors. Knolls Atomic Power Laboratory operates prototype nuclear propulsion plants in New York for the operational testing of new designs and promising new technologies under typical operating conditions prior to introduction into the fleet.



Metallographic Examination

Nuclear Component Procurement Organizations

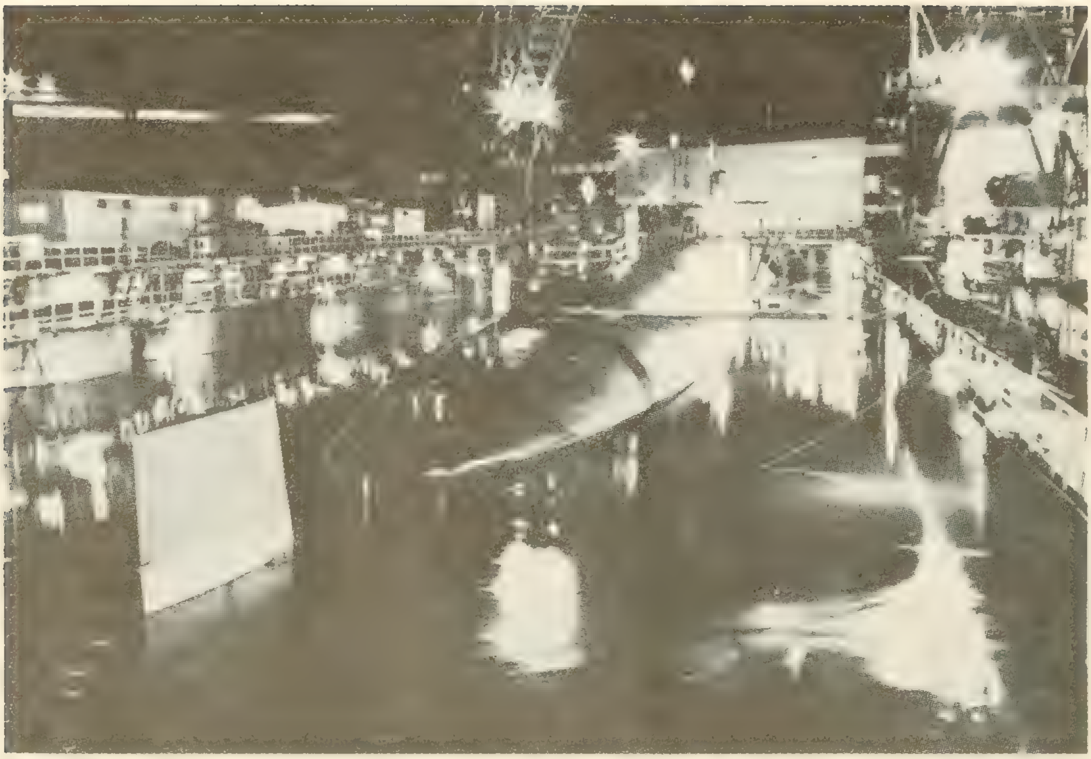
In the late 1950's, the Plant Apparatus Division (PAD) and the Machinery Apparatus Operation (MAO) were established to provide engineering, procurement, and technical oversight of Naval nuclear components. PAD and MAO are involved in the design, purchasing, quality control and delivery of major propulsion plant components for installation in nuclear-powered surface ships, submarines, and prototype plants.



Materials Fatigue Testing Equipment

Nuclear Equipment Suppliers

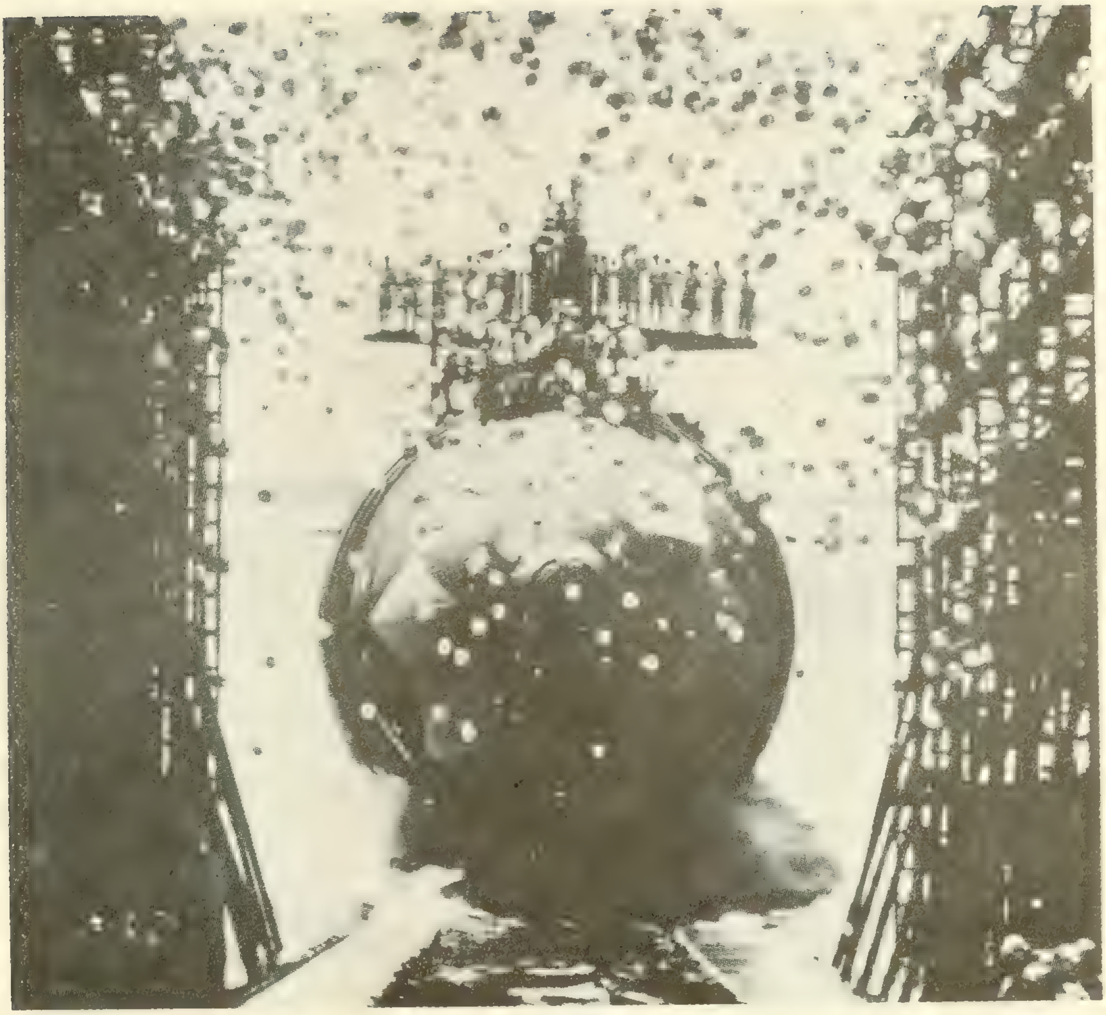
Multiple privately owned companies throughout the United States perform the actual design and fabrication of the major propulsion plant components. Manufacturing the heavy components used in Naval reactors requires four to five years of precision machining, welding, grinding, heat treatment and nondestructive testing of large, specialty metal forging, under carefully controlled conditions. Standards for Naval applications are far more rigorous and stringent than those required for civilian nuclear reactors, since components on warships must be designed and built to accommodate battle shock, radiated noise, shock, crew proximity to the reactor, and frequent, rapid changes in reactor power. Many of these equipment manufacturers have been contributing to the Program since its inception.



USS MICHIGAN (SSBN 727) Undergoing Testing in Dry Dock at Electric Boat

Shipyards

Two private shipyards currently build all of our nuclear-powered ships. These two shipyards together with four public shipyards overhaul, repair, refuel, and inactivate nuclear-powered ships. These complicated tasks require an experienced and skillful work force specifically trained to do Naval nuclear propulsion work. With approximately 60,000 employees, these public and private facilities are unique industrial assets with capabilities found no where else in the nation.



Launch of USS ATLANTA (SSN 712) in Newport News, Virginia

Support Facilities and Tenders

Fleet Intermediate Maintenance Activities (deployable tenders and support facilities at major bases) perform major maintenance on nuclear-powered ships outside of major shipyard availability periods such as those required to refuel the reactors. Staffed by over 20,000 specially trained personnel, these facilities provide upkeep and resupply support for the fleet. The tenders are themselves sea-going military vessels which routinely perform their missions while deployed all over the world. Thus, the ability of the nuclear-powered fleet to remain on station is further enhanced by our ability to forward-deploy repair and maintenance activities.

USS SIMON LAKE (AS-33) with Submarines Alongside in La Maddalena, Italy

Schools and Training Facilities

The unique training requirements of the Naval Nuclear Propulsion Program are met by special purpose training facilities staffed by highly qualified instructors. These facilities include the Nuclear Field "A" School and Nuclear Power School in Orlando, Florida; and Moored Training Ships and land prototypes which provide hands-on training and ensure that prior to their first sea tour, every operator has qualified on an operating nuclear reactor.

With the repeal of the Combat Exclusion Law in the 1994 Defense Authorization Act (DOD Budget) and the Navy decision to open combatant ships to women, the Program began accepting women into the training pipeline to be propulsion plant operators aboard nuclear-powered surface combatants. The first female officer and enlisted students began training at Nuclear Power School in the summer of 1994.

Enlisted Nuclear Power School Classroom

Headquarters

Naval Nuclear Propulsion Program Headquarters provides oversight and direction for all elements of the Program. Because of the critical nature of nuclear technology, all major technical decisions regarding design, procurement, operations, maintenance, training, and logistics are made by a dedicated Government headquarters professional staff expert in nuclear technology. Headquarters engineers set standards and specifications for all Naval Nuclear Propulsion Program work, while on-site headquarters representatives monitor the work at the laboratories, prototypes, shipyards, and prime contractors.

Based on decades of engineering experience in nuclear propulsion, the headquarters organization exercises exacting control over all aspects of the Program, demanding technical excellence and discipline unique in nuclear programs.

ESTABLISHMENT OF THE PROGRAM

In 1946, at the conclusion of World War II, Congress passed the Atomic Energy Act, which established the Atomic Energy Commission (AEC) to succeed the wartime Manhattan Project, and gave it sole responsibility for developing atomic energy. At this time, Captain Hyman G. Rickover was assigned to the Navy Bureau of Ships, the organization responsible for ship design. Captain Rickover recognized the military implications of successfully harnessing atomic power for submarine propulsion and that it would be necessary for the Navy to work with the AEC to develop such a program. He arranged for himself and several officers and civilians to be sent to the AEC laboratory at Oak Ridge, Tennessee for one year to learn the fundamentals of nuclear reactor technology.

Although the concept of using a reactor to produce heat was understood, the technology to build and operate a shipboard nuclear propulsion plant did not exist. Though there were several reactor concepts, the real challenge was to develop the technology and transform theory into practical engineering. New materials had to be developed, components designed, and fabrication techniques worked out. Further, installing and operating a steam propulsion plant inside the confines of a submarine and under the unique sub-sea pressure conditions, raised a number of technical difficulties. With these obstacles, the team at Oak Ridge knew that to build a Naval nuclear propulsion plant would require substantial commitment of resources and a new level of government and industry commitment.

Captain Rickover returned to Washington and used every opportunity from his post at the Bureau of Ships to argue the need to establish a Naval Nuclear Propulsion Program. Since there were many unknowns, he recommended undertaking two parallel reactor development projects: a pressurized water cooled reactor and a liquid metal cooled reactor.

By 1949, Captain Rickover had forged an arrangement between the AEC and the Navy under which he would proceed with both projects. In 1949, Rickover's new organization contracted with Westinghouse to develop a facility (the Bettis Atomic Power Laboratory) to work on the pressurized water design. In 1950, he contracted with General Electric to determine whether a liquid metal reactor design, that it was developing at the AEC's Knolls Atomic Power Laboratory, could be applied to Naval propulsion.

Captain Rickover recruited a strong technical staff from those who studied at Oak Ridge, others from past service in the Navy, and top young nuclear engineers right out of college. This core of engineers and Naval officers oversaw every aspect of the development of nuclear propulsion. USS NAUTILUS, using the pressurized water design, and USS SEAWOLF, using the liquid metal design, were built, tested, commissioned, and put to sea in 1954 and 1957, respectively. While SEAWOLF operated at sea for about two years, experience demonstrated that pressurized water technology was preferable for Naval applications. It thus became the basis for all subsequent U.S. nuclear-powered warship designs. Within a few short years, a revolution in Naval warfare had been born.

Admiral Rickover Inspecting USS NAUTILUS (SSN 571)

In the 1970's, Government restructuring moved the Naval Nuclear Propulsion Program from the AEC (which was disestablished) to what became the Department of Energy. During this transition, the Program retained its dual agency responsibility. Although the Naval Nuclear Propulsion Program has grown in size and scope over the years, its basic organization, responsibilities, and technical discipline have remained much as when it was first established.[1]

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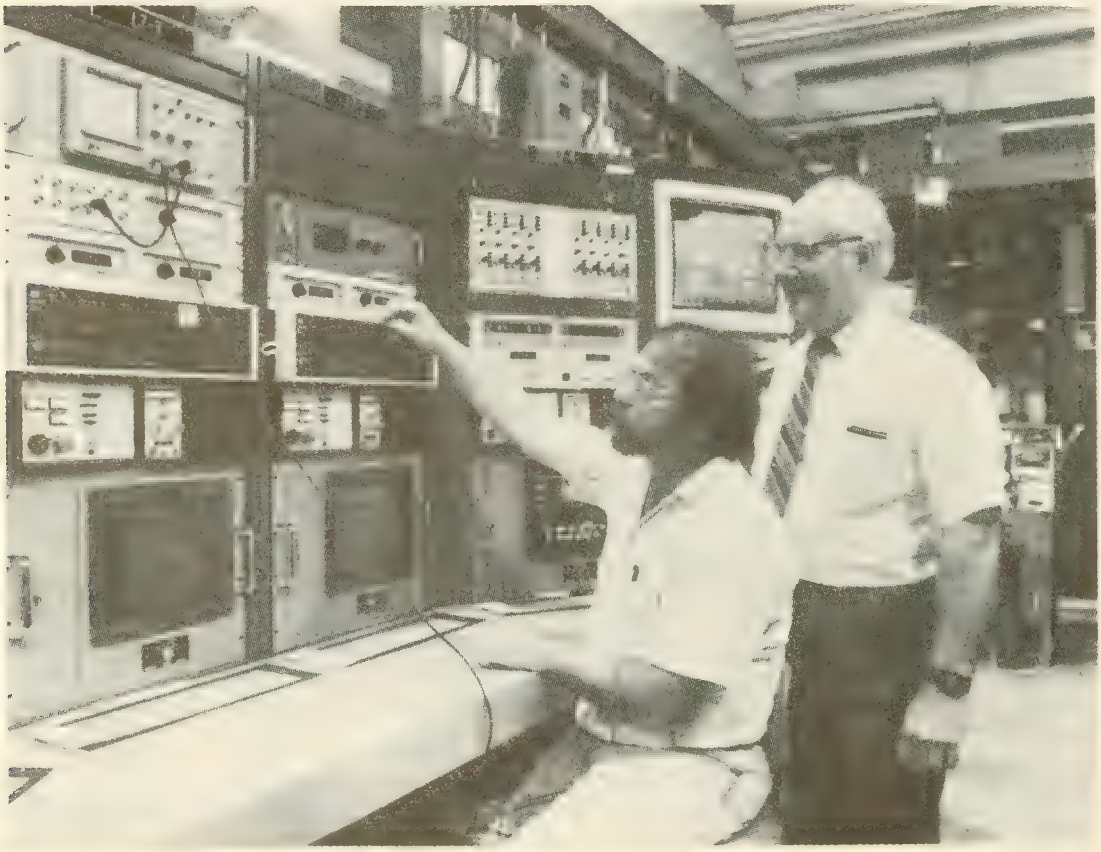
[1] For a more detailed history of the Naval Nuclear Propulsion Program, see Nuclear Navy, 1946-1962 by Richard G. Hewlett and Francis Duncan, 1974, University of Chicago Press, and Rickover and the Nuclear Navy: The Discipline of Technology by Francis Duncan, 1990, Naval Institute Press.

TECHNICAL AND MANAGEMENT PHILOSOPHY

Naval nuclear propulsion plants must be militarily capable and reliable in combat; and safe for the environment, the public, and those who operate and service them.

The Program has stayed at the forefront of technology to improve tactical speed, silencing, and reliability—characteristics that ensure a commanding edge in warfighting. Naval nuclear propulsion plants are rugged enough to sustain battle shock and keep operating; resilient enough to accommodate many years of frequent power changes; and designed to be operated and maintained by a highly trained Navy crew, without on-board scientists and engineers.



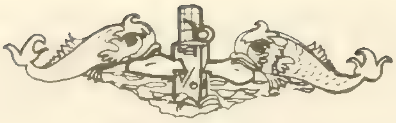
Metal Fracture Toughness Testing

The Program's small and relatively uncomplicated pressurized water reactors are inherently stable and can respond to operational transients without the need for immediate operator action. Fission products are completely maintained within high-integrity fuel elements that can withstand high shock loading. The reactor is so effectively shielded that a typical propulsion plant operator receives less radiation exposure from the reactor during a two-month submerged patrol than he would receive from background radiation on shore.

The Naval Nuclear Propulsion Program's success is based on strong central technical leadership, thorough training, conservatism in design and operating practices, and an understanding that in every aspect of the Program, excellence must be the norm. In addition, there is a recognition that to maintain these standards, individuals must accept responsibility for their actions. Admiral Rickover said it this way:

> "Responsibility is a unique concept: it can only reside and inhere in a single individual. You may share it with others, but your portion is not diminished. You may delegate it, but it is still with you. You may disclaim it, but you cannot divest yourself of it. Even if you do not recognize it or admit its presence, you cannot escape it. If responsibility is rightfully yours, no evasion, or ignorance or passing the blame can shift the burden to someone else. Unless you can point your finger at the man who is responsible when something goes wrong, then you have never had anyone really responsible."

Officer of the Deck on Watch



Submarine Warfare Insignia

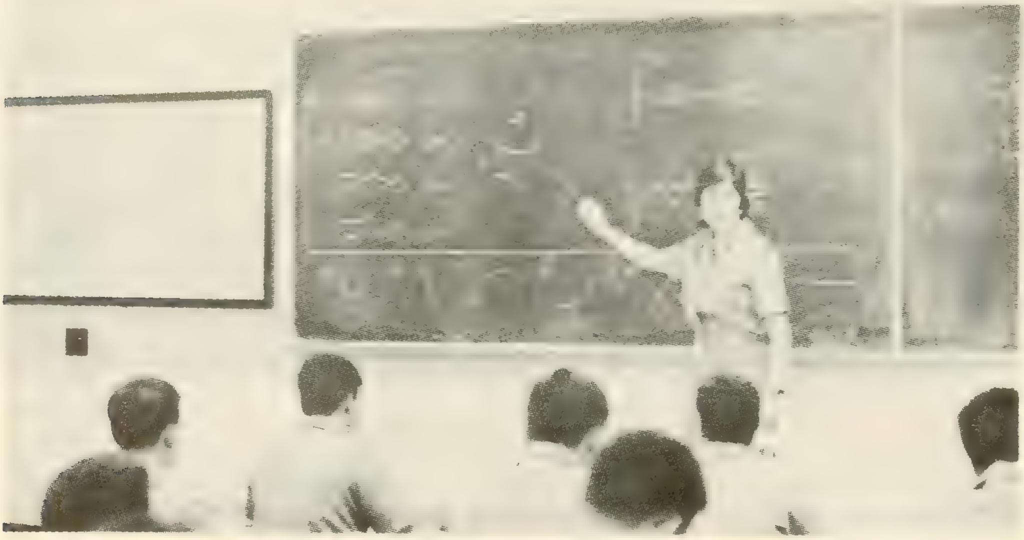
Surface Warfare Insignia

THE TRAINING PROGRAM

Thorough training minimizes problems, results in quick and efficient responses to emergencies, and helps ensure safety. Prospective plant operators must meet tough selection standards and successfully complete extensive nuclear propulsion training and qualification before reporting to a ship.

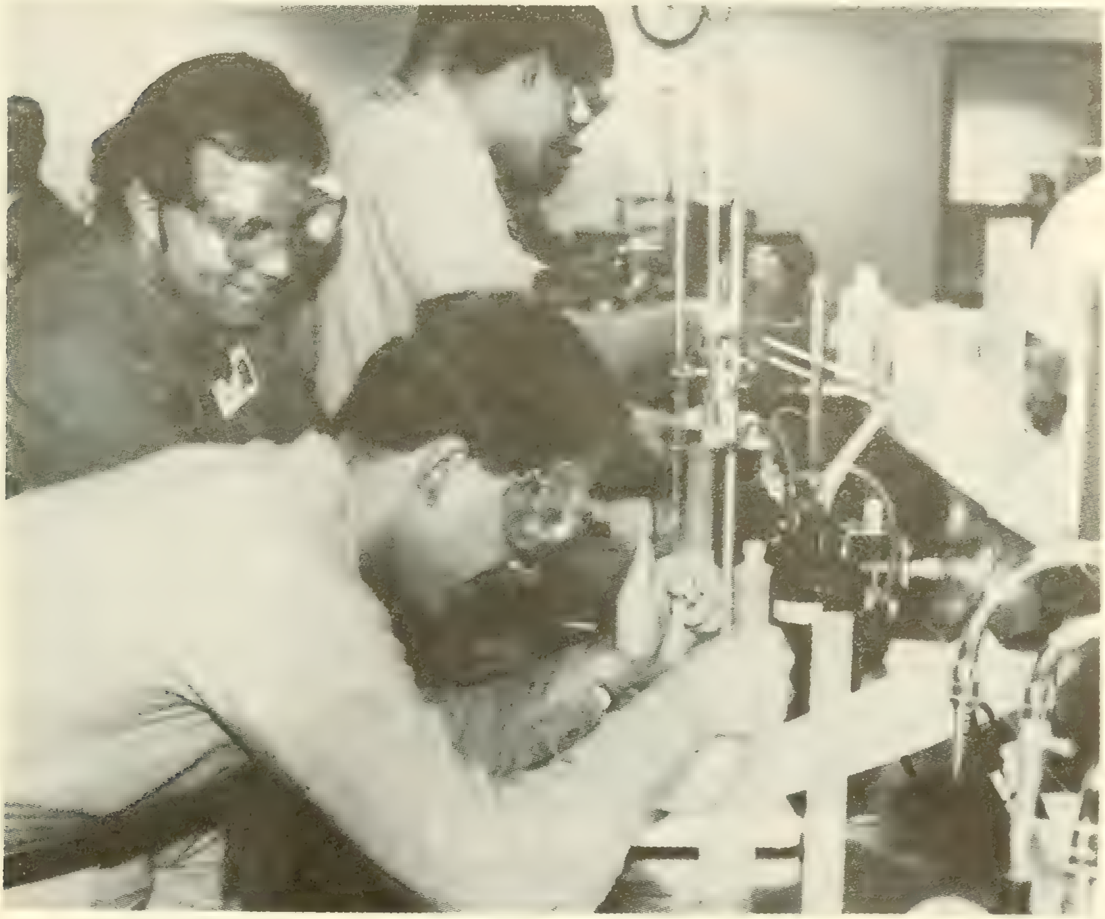
After selection for the nuclear propulsion program and completion of basic recruit training, enlisted personnel are assigned to Nuclear Field "A" School in Orlando, Florida, for initial in-rate instruction. In addition to preparatory courses in mathematics and physics, each student receives extensive hands-on training in equipment laboratories specially designed to teach required technical skills. The 24-week Nuclear Power School follows, providing basic academic knowledge necessary to understand the theory and operation of a nuclear propulsion plant. The curriculum is presented at the first-year collegiate level and includes thermodynamics, reactor principles, radiological fundamentals, and other specialized subjects.

For officers, all of whom are college graduates with technical training, the first step is the 24-week graduate-level course at Nuclear Power School. Here students receive highly technical instruction covering the theoretical background necessary to commence hands-on training on an operating reactor plant. Subjects include those taught in the enlisted curriculum (but in greater depth) as well as additional courses such as electrical engineering and reactor dynamics.



Officer Nuclear Power School Classroom

After Nuclear Power School, both officers and enlisted personnel are assigned to one of the Program's prototype propulsion plants or moored training ships for 26 weeks of additional classroom training and hands-on instruction. Each student qualifies as a propulsion plant operator, attaining extensive watchstanding experience and a thorough knowledge of all propulsion plant systems and their operating requirements. Under the guidance of experienced operator instructors, students learn how to react during normal and casualty situations on an operating Naval nuclear propulsion plant. Before reporting to a ship, they must qualify on their watchstation on an operating reactor.

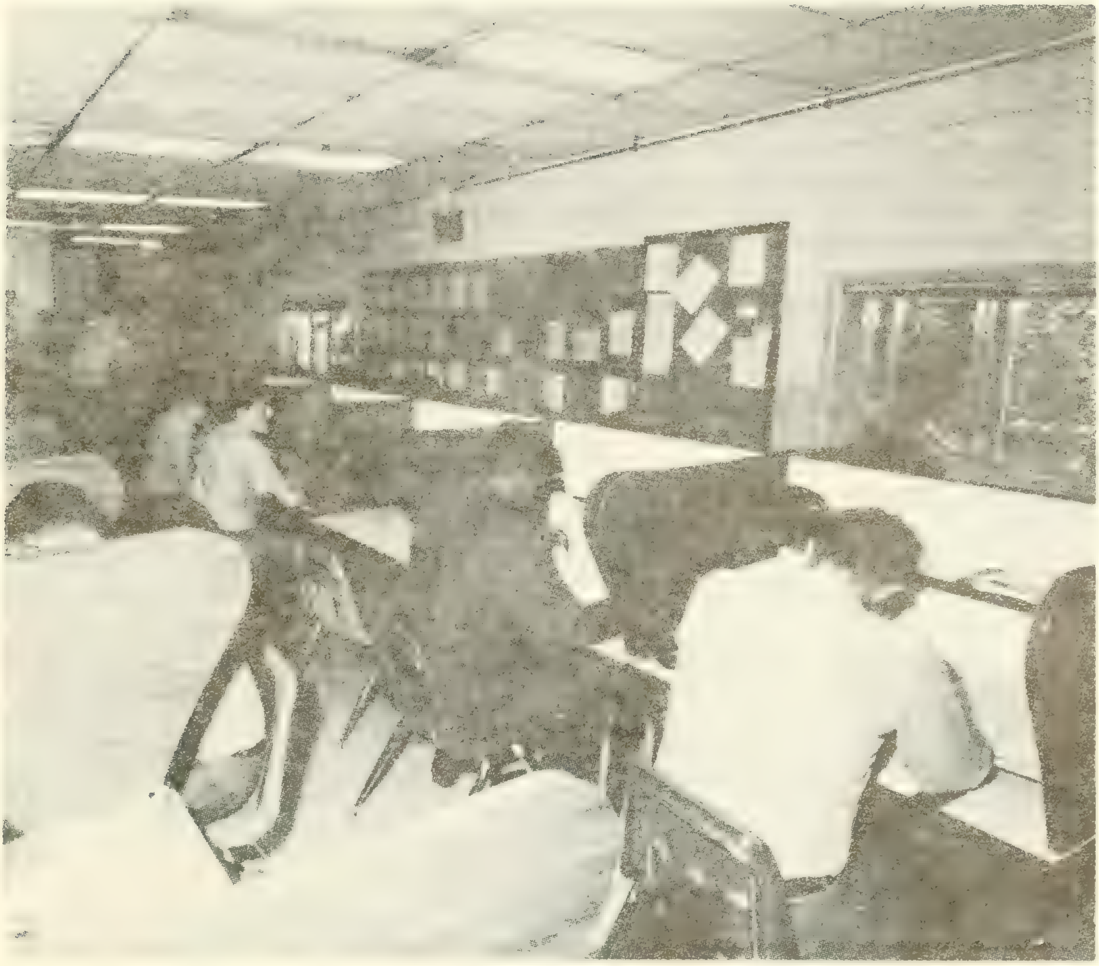


Engineering Laboratory Technician (ELT) Chemistry Training

Nuclear training onboard ship is every bit as demanding as the schools. Newly reporting officers and enlisted personnel must completely requalify as watchstanders and demonstrate their propulsion plant knowledge and operator ability at their new assignment.

Prototype Training

Even after shipboard qualification, shipboard operators participate in on-going Engineering Department training lectures, plant operational evolutions, and extensive casualty drills. To advance and assume greater responsibility, operators and officers must continue to demonstrate increasing proficiency and knowledge as they qualify and serve on more demanding watchstations. Shore training facilities provide operators advanced training in equipment repair and operation. All officers must qualify as Engineer Officer by successfully completing a comprehensive examination administered by Headquarters. Additionally, a rigorous advanced training program in nuclear propulsion plant operations is conducted at Headquarters for prospective Commanding Officers. The course must be successfully completed by any officer taking command of a nuclear-powered ship.



Prototype Study Room

Training is a way of life in the Nuclear Navy.

Machinist's Mate

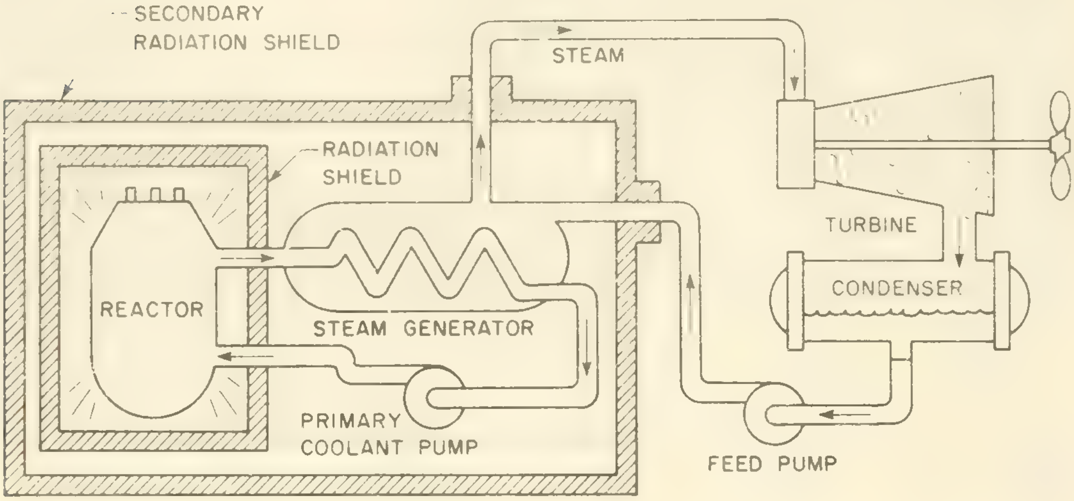
Electronics Technician

Electrician's Mate

DESCRIPTION OF A TYPICAL NAVAL NUCLEAR PROPULSION PLANT

In Naval nuclear propulsion plants, fissioning of uranium atoms in the reactor core produces heat. Since the fission process also produces radiation, shielding is placed around the reactor to protect the crew. During a typical submerged patrol, a typical crew member receives less exposure to radiation than he would if he remained ashore and worked in an office building.

U.S. Naval nuclear propulsion plants use a pressurized water reactor design which has two basic systems: the primary system and the secondary system. The primary system circulates ordinary water in an all-welded, closed loop consisting of the reactor vessel, piping, pumps, and steam generators. The heat produced in the reactor core is transferred to the water, which is kept under pressure to prevent boiling. The heated water passes through the steam generators where it gives up its energy. The primary water is then pumped back to the reactor to be heated again.



Pressurized Water Reactor

Inside the steam generators, the heat from the primary system is transferred across a water-tight boundary to the water in the secondary system, also a closed loop. The secondary water, which is at relatively low pressure, boils, creating steam. Isolation of the secondary system from the primary system prevents water in the two systems from intermixing, keeping radioactivity out of the secondary water.

In the secondary system, steam flows from the steam generators to drive the main propulsion turbines, which turn the ship's propeller, and the turbine generators, which supply the ship with electricity. After passing through the turbines, the steam is condensed back into water and feed pumps return it to the steam generators for reuse. Thus, the primary and secondary systems are separate, closed systems in which constantly circulating water transforms energy produced by the nuclear reaction into useful work.

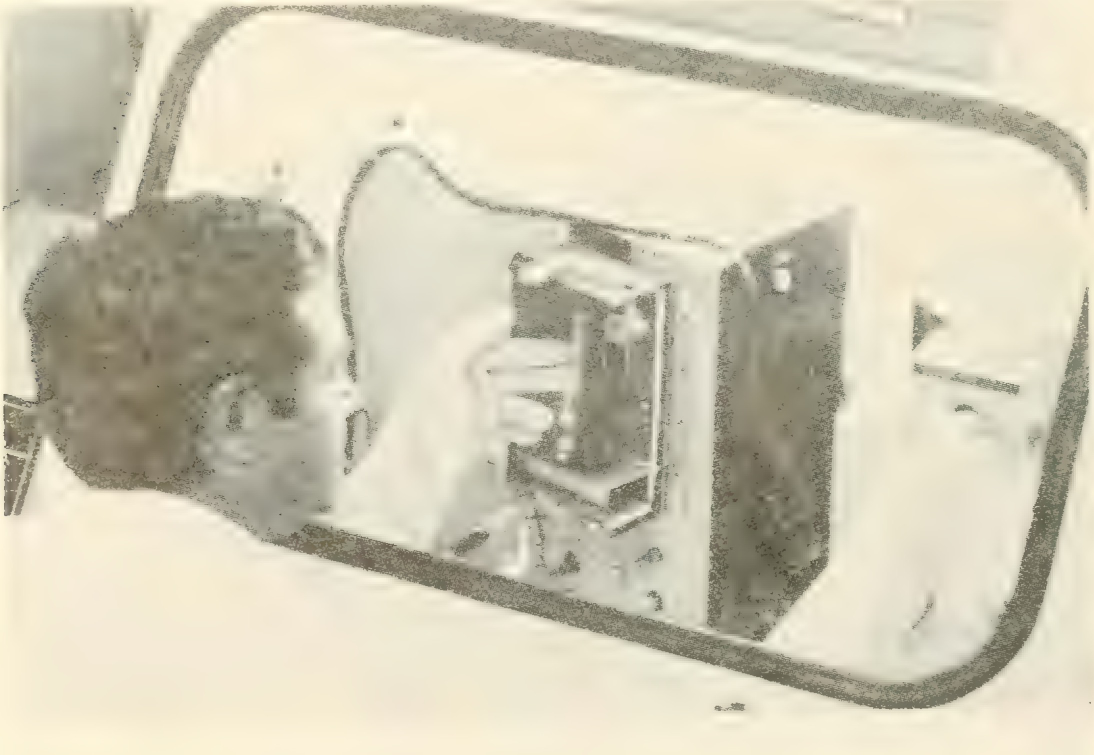
There is no step in this process that requires the presence of air or oxygen. This, combined with the ship's capability to produce oxygen and purified water from seawater, enables the ship to operate completely independent of the earth's atmosphere for extended periods of time. In fact, the length of a submerged submarine patrol is limited primarily by the amount of food the ship can carry for the crew.

USS LAFAYETTE (SSBN 616) Outbound on Deployment

CONCERN FOR THE ENVIRONMENT

Long before protection of the environment became a popular concern, it was a high priority in the Naval Nuclear Propulsion Program. From the beginning, the Program recognized that the environmental aspects of U.S. nuclear-powered ships and their operations would be key to their acceptance in ports both at home and abroad. The Program maintains the same rigorous attitude toward the control of radioactivity and protection of the environment as it does toward reactor design, testing, operation, and servicing. As a result, the Program has a well-documented record which demonstrates the absence of environmental impact; this record supports U.S. nuclear-powered ships being welcomed into over 150 ports in over 50 foreign countries and dependencies, as well as U.S. ports.

The policy of the Naval Nuclear Propulsion Program is to reduce radiation exposure to personnel to as low as reasonably achievable. In carrying out this policy, the Program has consistently maintained personnel radiation exposure standards more stringent than those in the civilian nuclear power industry or in other government nuclear programs. As a consequence, radiation exposure to the public and to personnel in the Program has always been very low, much lower than limits established by the Nuclear Regulatory Commission (NRC), the Department of Energy (DOE), or the Environmental Protection Agency (EPA) for other activities involved in radiological work.



Working in Containment

Environmental releases, both airborne and waterborne, are strictly controlled. As a result, the annual releases of long-lived gamma radioactivity from all Program activities are comparable to the annual releases from a single U.S. commercial nuclear reactor operating in accordance with its NRC license. Through the entire history of the Program, over 4500 reactor years of operation and over 100 million miles steamed on nuclear power, there has never been a reactor accident, or any release of radioactivity that has had a significant effect on the public or the environment. The Program's standards and record surpass those of any other national or international nuclear program.

The Program has an environmental monitoring program at each of its major installations and facilities, including nuclear capable shipyards and the homeports of nuclear-powered ships. This monitoring program consists of analyzing water, sediment, air, and marine samples for radioactivity to verify that Program operations have not had a significant effect on the radioactivity in the environment. Independent surveys conducted by the EPA, state and local governments confirm that U.S. Naval nuclear-powered ships and facilities have had no significant radiological effects on the environment.

Taking Water Samples for Analysis at Norfolk Naval Shipyard

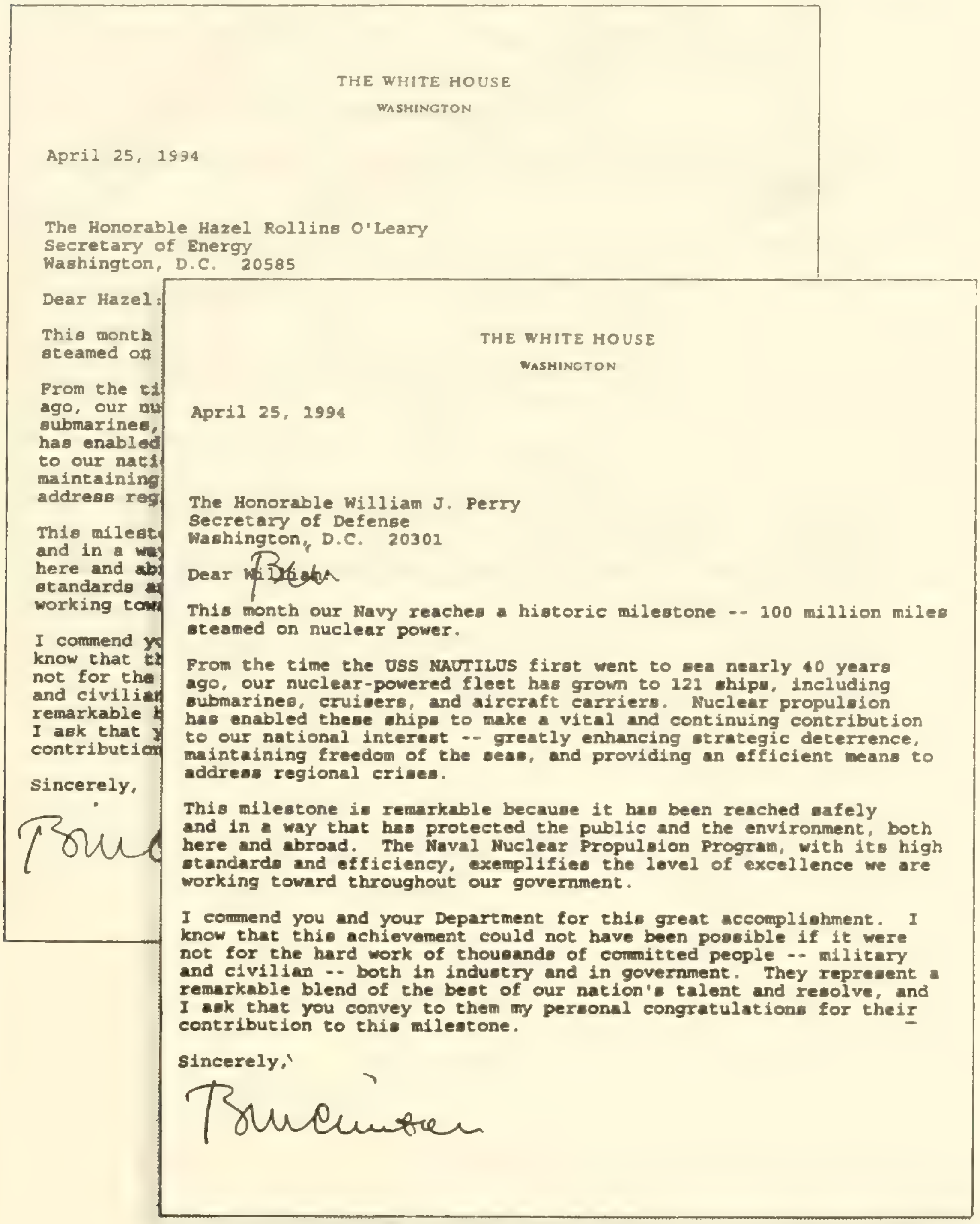
Ensuring proper environmental performance has also been a priority at Program DOE facilities, which are responsible for non-nuclear as well as nuclear environmental matters. Regular inspection of the Program's laboratory and prototype sites by the EPA and state officials in accordance with the Clean Air Act, the Resource Conservation and Recovery Act (RCRA), and the Clean Water Act, has shown no significant problems. None of these sites qualifies for inclusion on the EPA's National Priority List for cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA - also known as Superfund).

Additionally, the General Accounting Office (GAO), the auditing arm of Congress, performed a detailed 14-month audit of Program facilities in 1990-1991. The auditors covered Environmental, Safety, and Health matters and had unrestricted access to personnel, facilities, and classified information. In April 1991, the GAO testified to a Congressional committee that Naval Reactors is a "positive program in DOE," and that their review found "no significant deficiencies." Their final report was issued in August 1991 (GAO/RCED-91-157).

Finally, the Program exercises its environmental responsibilities from "cradle to grave" - from nuclear-powered warship design to ultimate disposal of the warship after its service life is over. For example, U.S. nuclear-powered submarines are recycled at the end of life, except for the submarine's reactor compartment which constitutes less than 20 percent of the ship and is buried as low-level radioactive waste. Spent nuclear fuel is turned over to the DOE for storage pending placement in a geologic repository.

NAVAL NUCLEAR PROPULSION PROGRAM ACCOMPLISHMENTS

In April 1994, President Bill Clinton congratulated the Secretaries of Defense and Energy on U.S. nuclear-powered warships steaming past the 100 million mile mark on nuclear power.



THE WHITE HOUSE
WASHINGTON

April 25, 1994

The Honorable Hazel Rollins O'Leary
Secretary of Energy
Washington, D.C. 20585

Dear Hazel:

This month
steamed on

From the
ago, our
submarines,
has enabled
to our
maintaining
address

This
and in a
here and
standards
working

I commend
know that
not for the
and
remarkable
I ask that
contribution

Sincerely,

THE WHITE HOUSE
WASHINGTON

April 25, 1994

The Honorable William J. Perry
Secretary of Defense
Washington, D.C. 20301

Dear ~~William~~ Bill

This month our Navy reaches a historic milestone -- 100 million miles steamed on nuclear power.

From the time the USS NAUTILUS first went to sea nearly 40 years ago, our nuclear-powered fleet has grown to 121 ships, including submarines, cruisers, and aircraft carriers. Nuclear propulsion has enabled these ships to make a vital and continuing contribution to our national interest -- greatly enhancing strategic deterrence, maintaining freedom of the seas, and providing an efficient means to address regional crises.

This milestone is remarkable because it has been reached safely and in a way that has protected the public and the environment, both here and abroad. The Naval Nuclear Propulsion Program, with its high standards and efficiency, exemplifies the level of excellence we are working toward throughout our government.

I commend you and your Department for this great accomplishment. I know that this achievement could not have been possible if it were not for the hard work of thousands of committed people -- military and civilian -- both in industry and in government. They represent a remarkable blend of the best of our nation's talent and resolve, and I ask that you convey to them my personal congratulations for their contribution to this milestone.

Sincerely,

Bill Clinton

In addition to the military applications of nuclear power, technology developed by the Naval Nuclear Propulsion Program is the basis for civilian nuclear power around the world. Significant contributions include:

- the uranium-dioxide fuel system—now the most widely used system in nuclear power;
- the design for large pressurized water reactor components and the cladding for large pressure vessels;
- containment concepts and refueling techniques for power reactors;
- a system for preventing damage to a reactor core even if failures occur in the cooling system;
- the first successful method of radioactive decontamination of reactor plants;
- zirconium, zirconium alloys, boron, and hafnium materials for cladding and reactor control use;
- numerous computer programs widely used for design safety, research, and testing;
- the first chemical cleaning process for nuclear plant steam generators;
- ultrasonic inspection methods for evaluating the material status of the reactor vessel and major components;
- nuclear fabrication standards, quality control requirements, and equipment specifications; and
- development and publication of the CHART OF THE NUCLIDES, used world wide for nuclear research and development work.

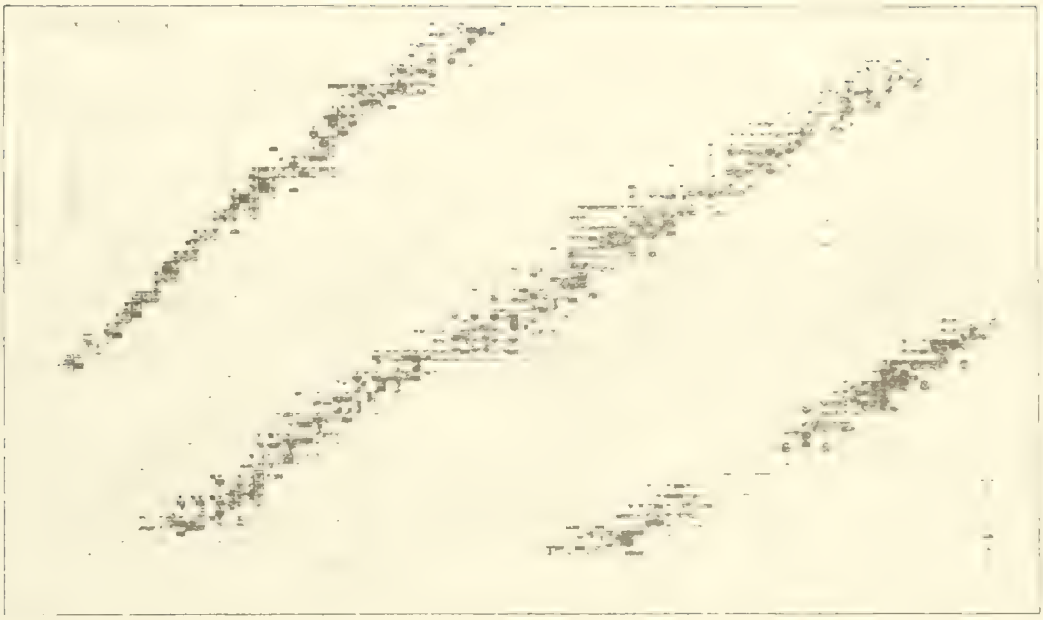


Chart of the Nuclides

The Program also shares with industry information from its research in a variety of areas, including: corrosion and wear technology for components operating in high-temperature, high-pressure water; pressurized water reactor heat transfer and fluid flow technology; predicting performance of reactors in accident scenarios; and numerical analysis of reactor designs using digital computers. This has resulted in over 5000 technical reports which have been made available to industry and the public.

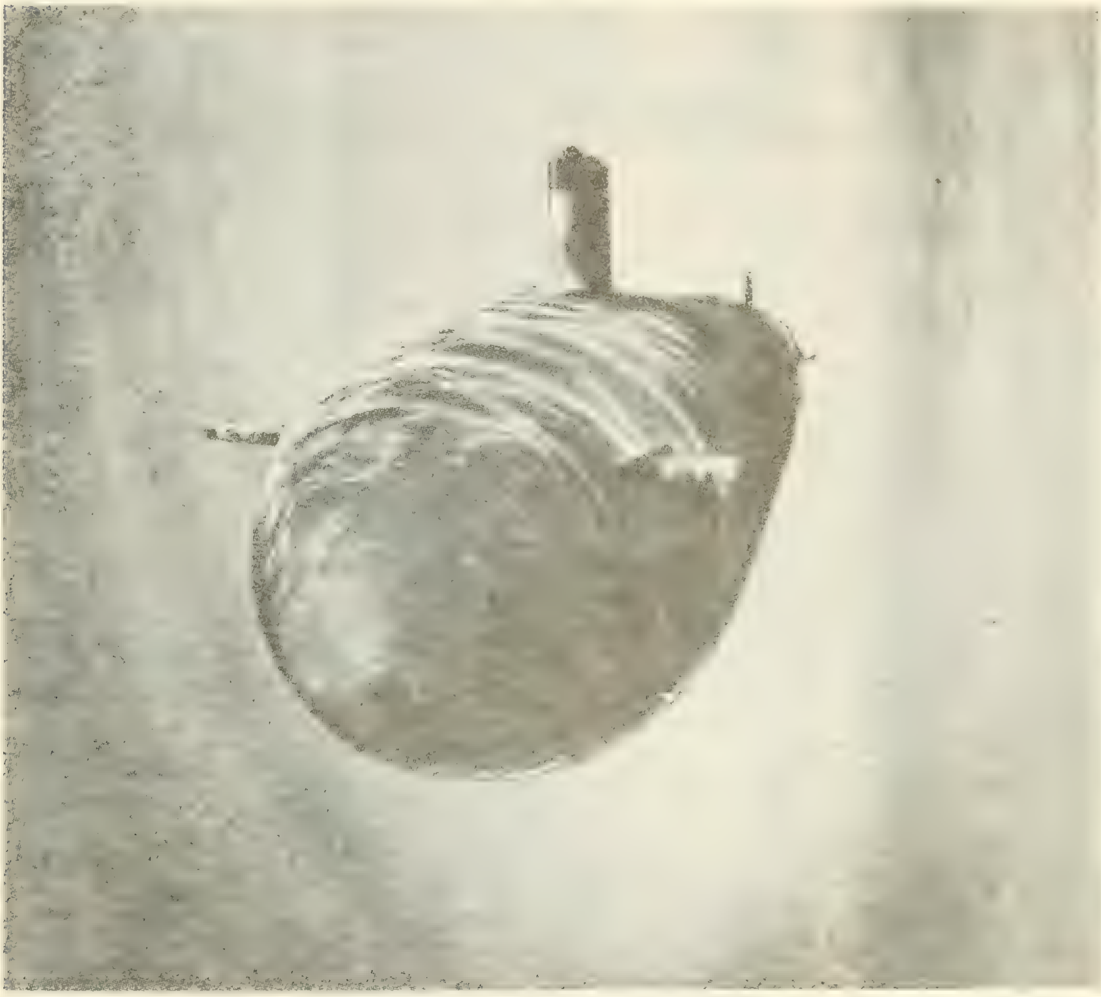
Perhaps the most important contribution to the civilian sector is the thousands of highly trained Program graduates who now play key roles in the operation and management of civilian nuclear power reactors.

THE FUTURE

The Naval Nuclear Propulsion Program continues to advance reactor technology while exploring whether new energy conversion and reactor concepts could better meet the unique requirements of Naval nuclear propulsion.

Laboratory Research

Program research seeks to make nuclear propulsion quieter, extend the life and efficiency of the nuclear core, further simplify operation of the reactor plant, reduce the already low life cycle maintenance costs, and design propulsion plants with increased power output without increasing their size or cost.



SEAWOLF (SSN 21) (Artist's Conception)

USS HADDOCK (SSN 621) Underway in the Gulf of Mexico

APPENDIX

THE FIRST NAVAL NUCLEAR PROPULSION PLANTS
- The First Prototype (S1W)
- USS NAUTILUS (SSN 571)
- USS SEAWOLF (SSN 575)

CLASSES OF NUCLEAR-POWERED SHIPS
- Submarines
- Surface Ships

OPERATIONS
- Operation Sea Orbit
- Operations in the Indian Ocean and the Persian Gulf
- Arctic Operations

SPECIAL PROJECTS
- Shippingport
- Light Water Breeder Reactor (LWBR)
- NR-1

PROGRAM LOCATIONS

PROGRAM DIRECTORS—PAST AND PRESENT
- Admiral H. G. Rickover
- Admiral K. R. McKee
- Admiral B. DeMars

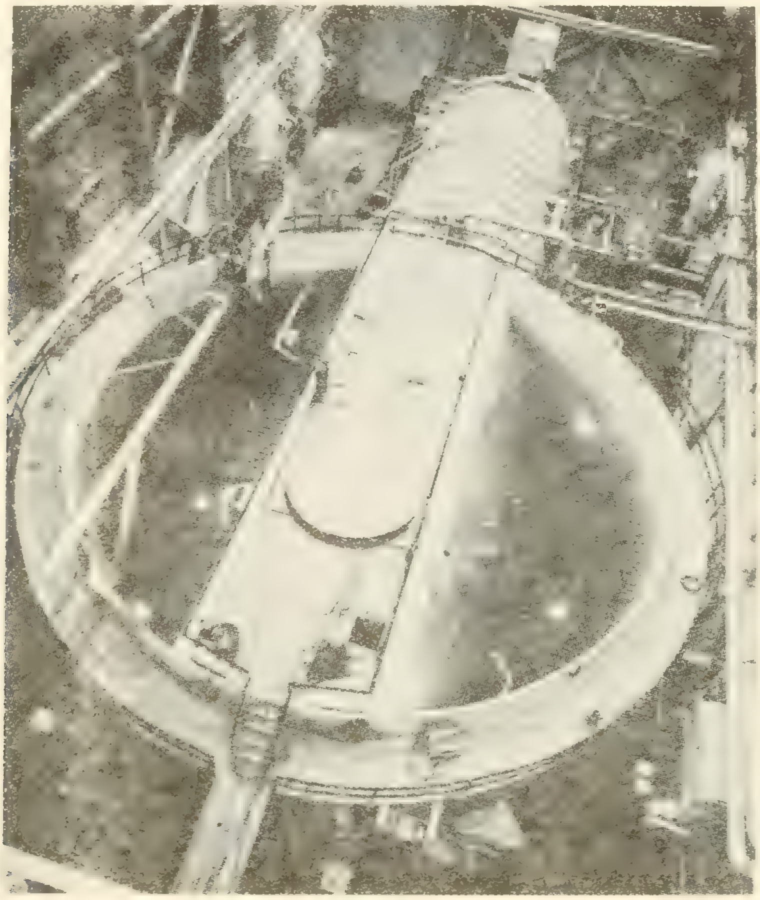
PROGRAM STATISTICS
- A Brief Summary
- Ships

THE FIRST NAVAL NUCLEAR PROPULSION PLANTS

The First Prototype (S1W)

December 1948 The AEC contracts with Westinghouse to design, build, operate, and test a prototype pressurized-water, Naval nuclear propulsion plant (known alternatively as Submarine Thermal Reactor, Mark 1, or simply S1W).

1950-1953 S1W is constructed at the AEC's National Reactor Testing Station (now DOE's Idaho National Engineering Laboratory) inside a submarine hull surrounded by a 300,000-gallon tank of water simulating the ocean.



S1W Prototype with Water Tank to Simulate the Ocean Environment

March 30, 1953 S1W reaches criticality at 11:17 p.m., marking the first production of significant quantities of useful nuclear power in the world.

June 25, 1953 S1W achieves full design power; commences a successful 96-hour sustained full-power run, simulating a submerged crossing of the Atlantic Ocean.

Late 1955 Following nearly two years of continuous operation and testing and a refueling, S1W completes a 66-day continuous full-power run—this could have propelled a submarine at high speed twice around the globe.

October 1989 DOE permanently shuts down S1W after 36 years of successful operation. The last 22 years of operation were performed using the same reactor core, setting a longevity record. Over 13,000 Navy officer and enlisted operators trained at S1W.

USS NAUTILUS (SSN 571)

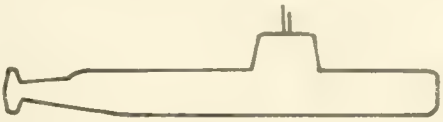
August 1949 The CNO establishes a January 1955 "ready-for-sea" date for development of a submarine nuclear propulsion plant.

August 1950 President Harry S Truman signs Public Law 674, authorizing construction of NAUTILUS.

August 1951 Electric Boat begins construction of the first nuclear-powered submarine.

June 1952 President Truman lays the keel of the NAUTILUS.

September 1954 NAUTILUS is commissioned.



NAUTILUS DATA

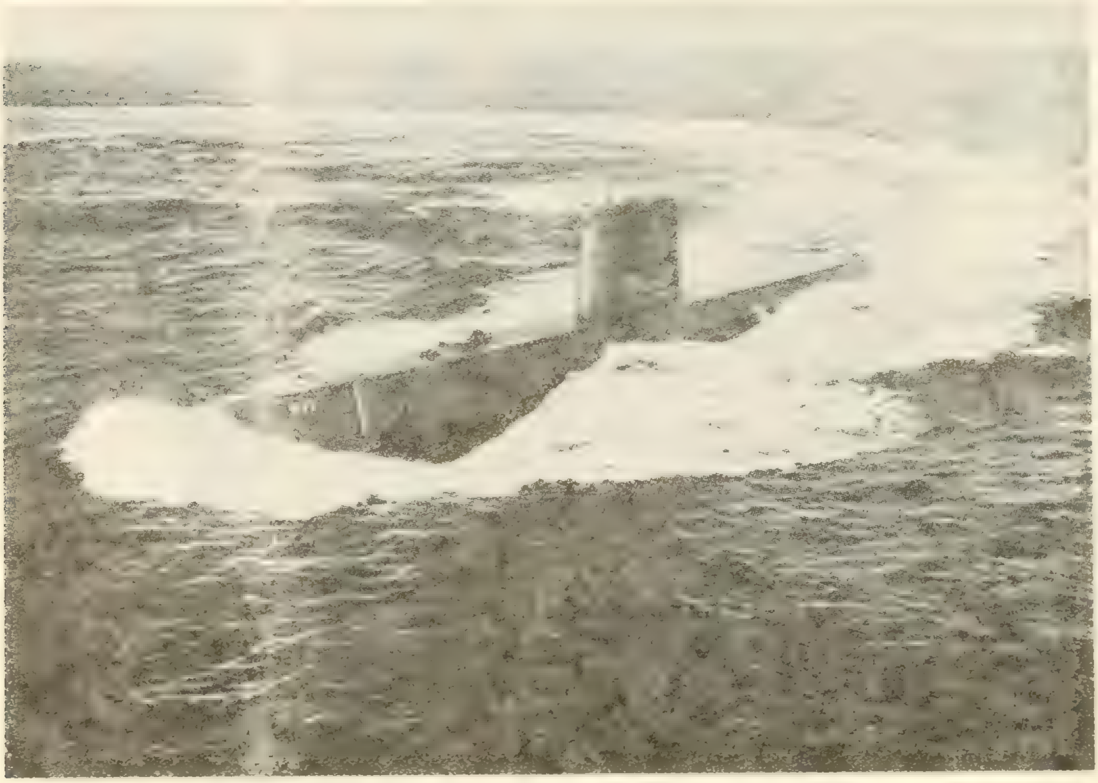
Length - 319 feet

Beam - 27 feet

Displacement - 4092 tons

January 1955 Under the command of CDR Eugene P. Wilkinson, USS NAUTILUS puts to sea for the first time—less than four years after construction began—signalling her historic message, "Underway on nuclear power."

February 1955 NAUTILUS steams 1300 submerged miles from New London, Connecticut, to San Juan, Puerto Rico in 84 hours—ten times farther than previously traveled by a submerged submarine. This is the first time that a submarine maintains a high speed (about 16 knots average) for longer than an hour.



USS NAUTILUS (SSN 571) at Sea

1957 NAUTILUS is refueled after steaming over 62,000 miles on her first core. The ship was fully submerged for more than half the distance.

August 3, 1958 NAUTILUS, during an 1800-mile, 96-hour historic trans-Polar voyage from Point Barrow, Alaska to the Greenland Sea, becomes the first ship to reach the geographic North Pole. For demonstrating the Arctic's strategic potential, President Eisenhower awards NAUTILUS the Presidential Unit Citation (the first such award in peacetime) and her commanding officer, CDR William R. Anderson, the Legion of Merit.

1960 NAUTILUS deploys to the Mediterranean and becomes the first nuclear-powered submarine assigned to the Sixth Fleet.

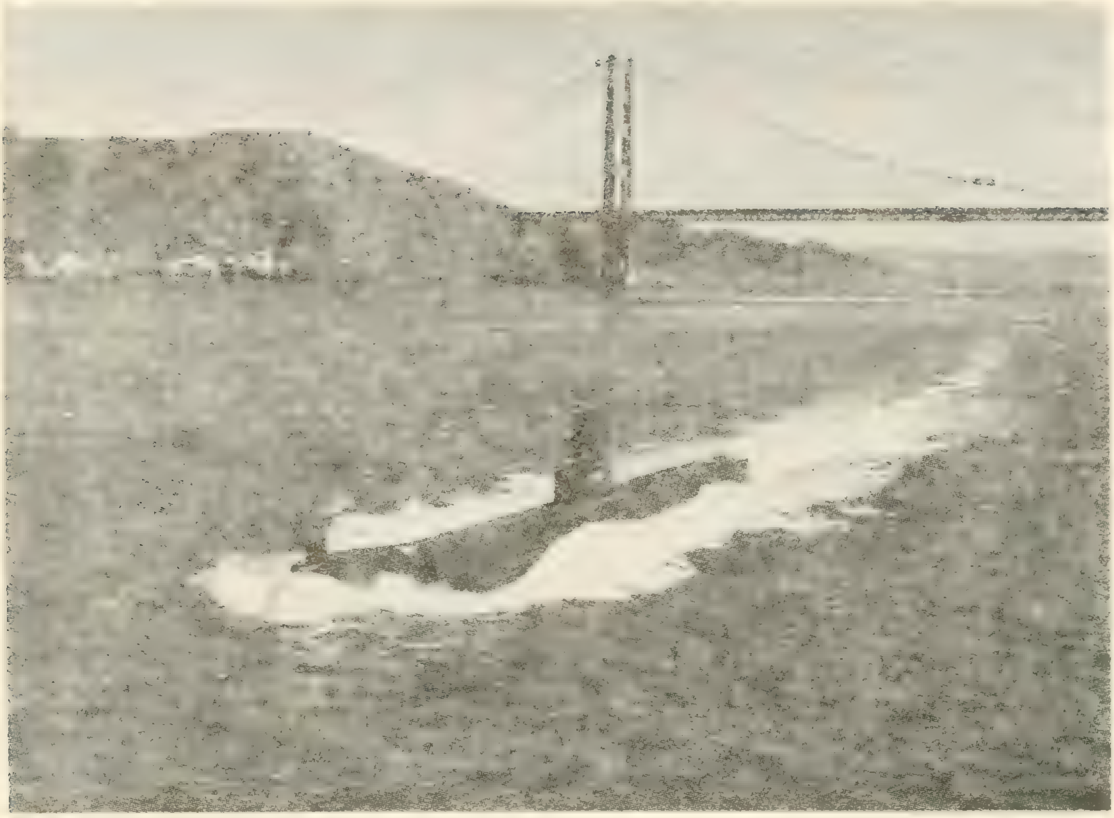
1960-1979 NAUTILUS participates in numerous defense missions, including the Naval quarantine during the 1962 Cuban missile crisis, and demonstrates U.S. technical capability through high-visibility visits to numerous foreign ports in the Atlantic and Mediterranean.

April 1979 NAUTILUS departs Groton, Connecticut, en route to California, for her final voyage. Completes her 2500th dive and 510,000 miles on nuclear power.

May 1979 NAUTILUS enters Mare Island Naval Shipyard for inactivation and conversion as a historic ship for public display. Following this, NAUTILUS leaves California under tow for the Naval Submarine Base in Groton.

Today NAUTILUS is currently a National Historic Landmark open to the public as part of the NAUTILUS Memorial and Submarine Force Library and Museum, Groton, Connecticut. (For additional information, write to Box 571, NAVSUBASE, Groton, CT 06349-5000.)

NAUTILUS Memorial and Submarine Force Library and Museum, Groton, Connecticut



USS SEAWOLF (SSN 575) Outbound in San Francisco Bay

USS SEAWOLF (SSN 575)

April 1950 General Electric begins design work on a liquid-sodium Naval nuclear propulsion plant as an alternative to pressurized water for a second nuclear-powered submarine—the USS SEAWOLF.

September 1953 SEAWOLF's keel is laid at Electric Boat.

June 1956 The ship's reactor reaches criticality.

October 1958 While operating as an active unit of the Atlantic Fleet, SEAWOLF completes a record-breaking 60-day submerged run, traveling over 13,000 miles.

December 1958 Although operating satisfactorily for almost two years, the SEAWOLF's sodium-cooled plant is significantly less attractive for Naval warships than pressurized water alternatives. Therefore, the SEAWOLF plant is replaced with a pressurized-water plant (S2W) similar to that installed in NAUTILUS. SEAWOLF's sodium plant has steamed over 71,000 miles, fully submerged for over three quarters of this distance.

March 1987 SEAWOLF is decommissioned after 30 years of operation and over 473,000 miles steamed on nuclear power.

CLASSES OF NUCLEAR-POWERED SHIPS

Submarines

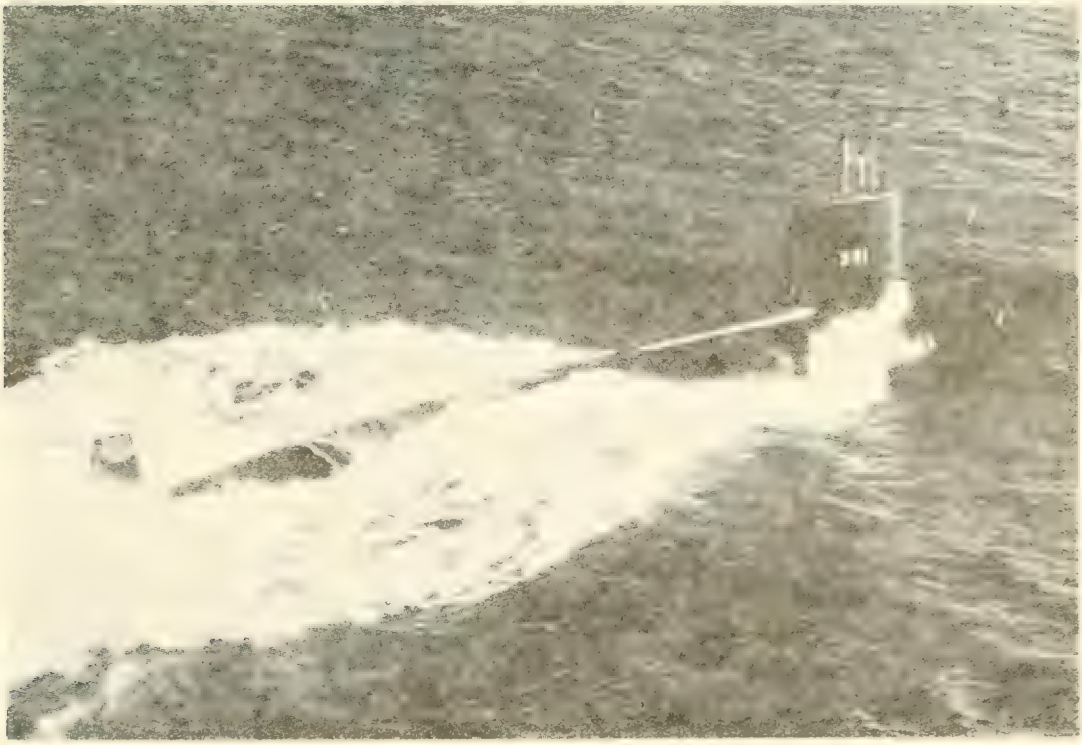
Early SSNs With the success of NAUTILUS, the Navy launched a series of attack submarine classes (SKATE, SKIPJACK, and PERMIT) which introduced different warfighting and design features.

USS SHARK (SSN 591) DATA
(SKIPJACK Class)

Length - 249 feet

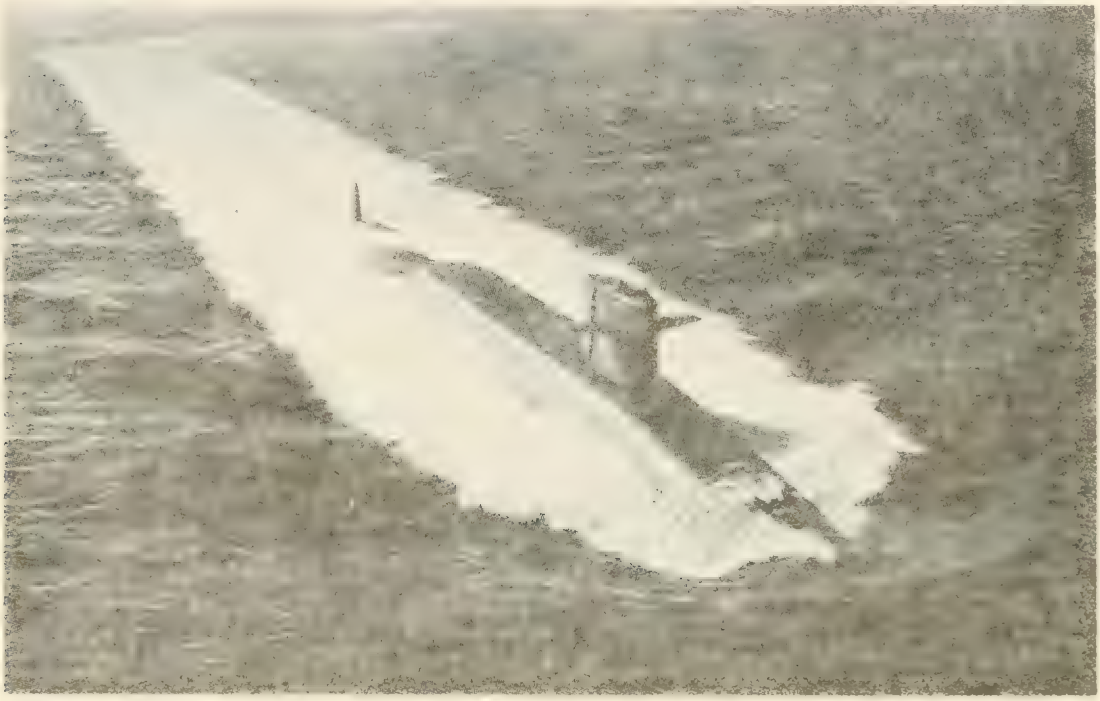
Beam - 32 feet

Displacement - 3075 tons



USS SHARK (SSN 591) on Sea Trials

Fleet Ballistic Missile (FBM) Submarines With NAUTILUS still in operational testing, the Navy began developing a submarine ballistic missile system, which it brought from inception to deployment in five years. In the first Class of FBMs (GEORGE WASHINGTON), the Navy extended SSN hulls to add a missile compartment amidships. In the 1960's, subsequent FBM Classes (ETHAN ALLEN, LAFAYETTE, JAMES MADISON, and BENJAMIN FRANKLIN) were designed from the keel up as missile submarines. Each carried 16 POLARIS missiles, but were later back-fitted with the more powerful and accurate POSEIDON missile.



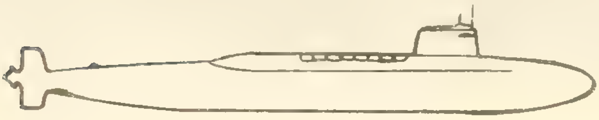
USS ALEXANDER HAMILTON (SSBN 617)

USS ALEXANDER HAMILTON (SSBN 617) DATA
(LAFAYETTE Class)

Length - 425 feet

Beam - 33 feet

Displacement - 7363 tons



USS HAMMERHEAD (SSN 663)

SSN 637 Class After deployment of PERMIT Class submarines, the Navy began building STURGEON Class submarines, which combined the most advantageous warfighting elements of the early SSN classes. With well-tested, quiet, and dependable propulsion plants, the thirty-seven SSN 637 Class submarines were the mainstay of our nuclear fleet into the 1980's.

USS HAMMERHEAD (SSN 663) DATA
(STURGEON Class)

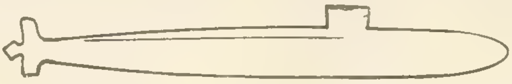
Length - 292 feet

Beam - 32 feet

Displacement - 4268 tons

Single-ship Designs The Navy built several single-ship class submarines – USS TULLIBEE (SSN 597), USS NARWHAL (SSN 671), and USS GLENARD P. LIPSCOMB (SSN 685) – each to explore alternate propulsion plant concepts (for example, turbine electric drive and different reactor and propulsion turbine designs). Technology developed in these efforts became the basis for later classes.

SSN 688 Class With a high-power propulsion plant, advanced sonar, and improved torpedo fire control systems, SSN 688 (LOS ANGELES) Class submarines provide high-speed escort, anti-submarine and anti-surface warfare roles with a minimum underwater noise signature. More recent 688s, beginning with USS SAN JUAN (SSN 751), incorporate the latest technological advances, including cruise missile capability, a new combat system, and retractable bow planes. With over sixty 688s commissioned or under construction, this submarine will be our front line warship into the 21st century.

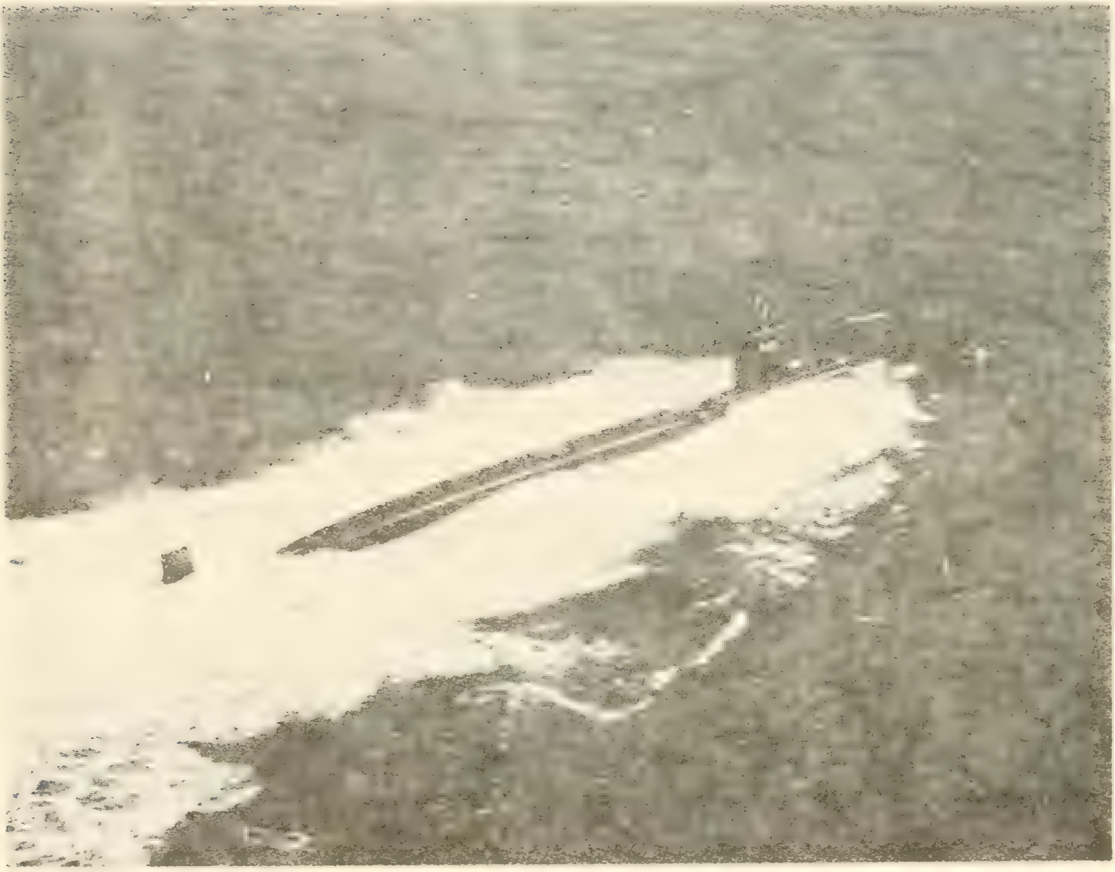


USS ALBANY (SSN 753) DATA
(LOS ANGELES Class)

Length - 362 feet

Beam - 33 feet

Displacement - 6927 tons



USS ALBANY (SSN 753)

USS PENNSYLVANIA (SSBN 735)

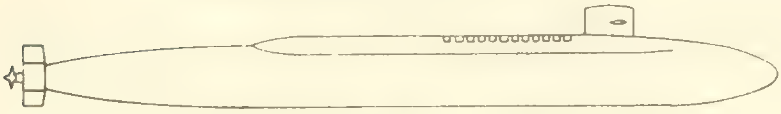
TRIDENT Ballistic Missile Submarines Virtually undetectable in the open ocean, TRIDENT submarines are quieter, better equipped, and have greater missile range than their predecessors. With an advanced-design, long-life reactor plant, and a unique comprehensive program to ensure equipment reliability and material availability, TRIDENTs operate for long periods between servicings. TRIDENT's size (approximately 560 feet in length) provides room to incorporate future modifications and technological developments. Large hatches and a carefully planned equipment arrangement facilitate component servicing and replacement.

USS PENNSYLVANIA (SSBN 735) DATA
(OHIO Class)

Length - 560 feet

Beam - 42 feet

Displacement - 18,700 tons



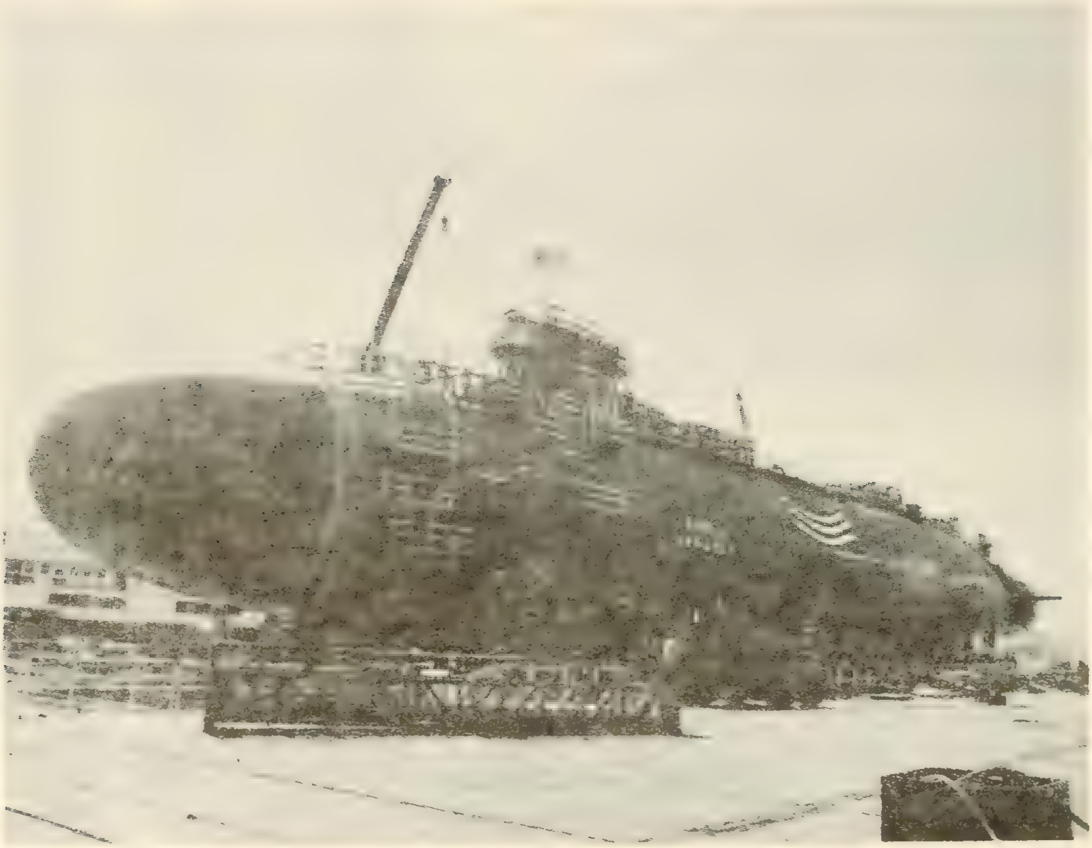
SSN 21 The SSN 21 (SEAWOLF) will go faster, dive deeper, and carry significantly more weapons than its predecessors. With a high power-density propulsion plant that can operate quietly over the ship's entire speed range, SEAWOLF will be the most capable submarine in the world. In addition, the technology developed for SEAWOLF will be applied to future generations of nuclear-powered warships.

SEAWOLF (SSN 21) DATA

Length - 353 feet

Beam - 40 feet

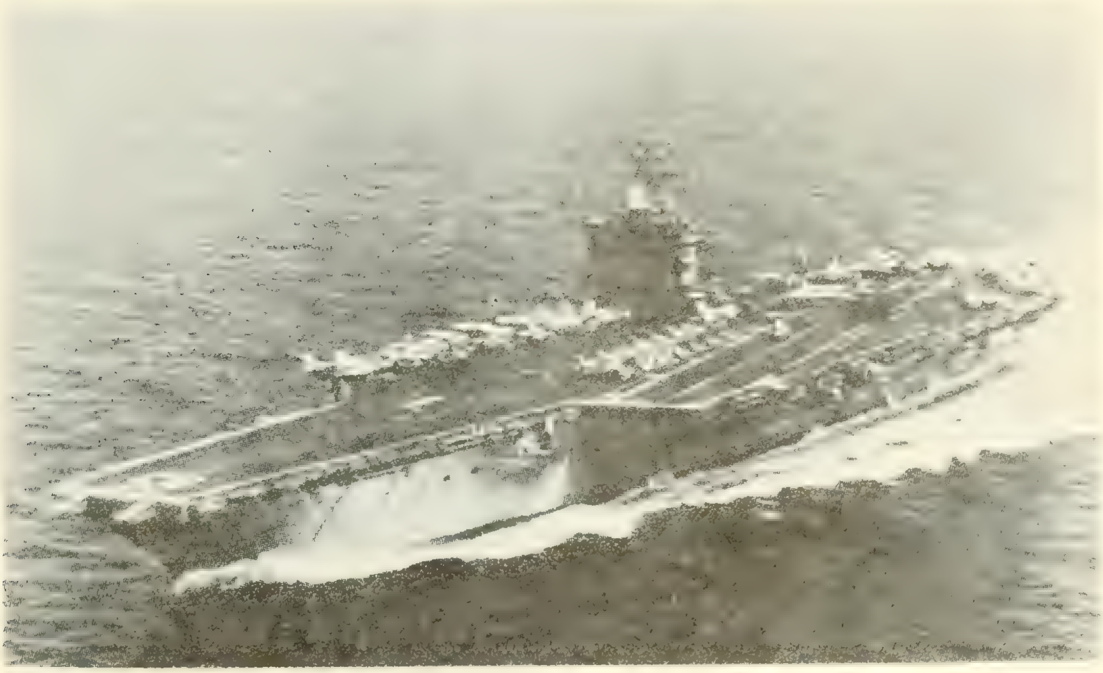
Displacement - 9150 tons



SEAWOLF (SSN 21) (Nearing Completion at Electric Boat)

Surface Ships

The First Aircraft Carrier Prototype Built at the National Reactor Testing Station in southeastern Idaho, the A1W prototype plant consisted of two reactors and associated steam plant equipment necessary to drive one shaft of an aircraft carrier. A1W first operated at full power on September 15, 1959. The A1W prototype plant was permanently shut down on January 26, 1994 after more than 34 years of successful operations. Over 14,500 Navy officers and enlisted operators trained at A1W.



USS ENTERPRISE (CVN 65)

USS ENTERPRISE The first nuclear-powered aircraft carrier, USS ENTERPRISE put to sea in 1961 with eight reactors capable of propelling ENTERPRISE at speeds in excess of 30 knots. The original cores lasted three years; current ENTERPRISE cores have a life of over 20 years. ENTERPRISE displaces approximately 93,000 tons fully loaded, is as tall as a 23-story building (keel to mast top), has four and a half acres of flight deck, an overall length of 1101 feet, and carries a crew (including her air wing) of about 5000 personnel.

USS ENTERPRISE (CVN 65) DATA

Length - 1101 feet

Overall Width - 248 feet

Combat Load Displacement - 93,000 tons

USS NIMITZ (CVN 68) Underway off Norway

USS NIMITZ Class Success with ENTERPRISE led to the larger USS NIMITZ Class carrier. A NIMITZ Class carrier's two reactors produce more power than ENTERPRISE's eight, she can store 50 percent more ammunition, can carry twice as much aviation fuel as the largest conventional carrier, and her cores will last over 20 years.

USS NIMITZ (CVN 68) DATA

Length - 1092 feet

Overall Width - 257 feet

Combat Load Displacement - 95,000 tons

Cruisers Beginning with the 17,000-ton USS LONG BEACH (CGN 9) and the 9600-ton USS BAINBRIDGE (CGN 25), the Navy has built several types of nuclear-powered cruisers. Nuclear power and multi-mission capability (anti-air, anti-surface, and anti-submarine) make these cruisers some of the most versatile ships afloat. The success of CGN 9 and CGN 25 led the Navy to construct seven additional nuclear-powered cruisers.

USS SOUTH CAROLINA (CGN 37) DATA
(CALIFORNIA Class)

Length -	596 feet
Beam -	61 feet
Displacement -	11,220 tons

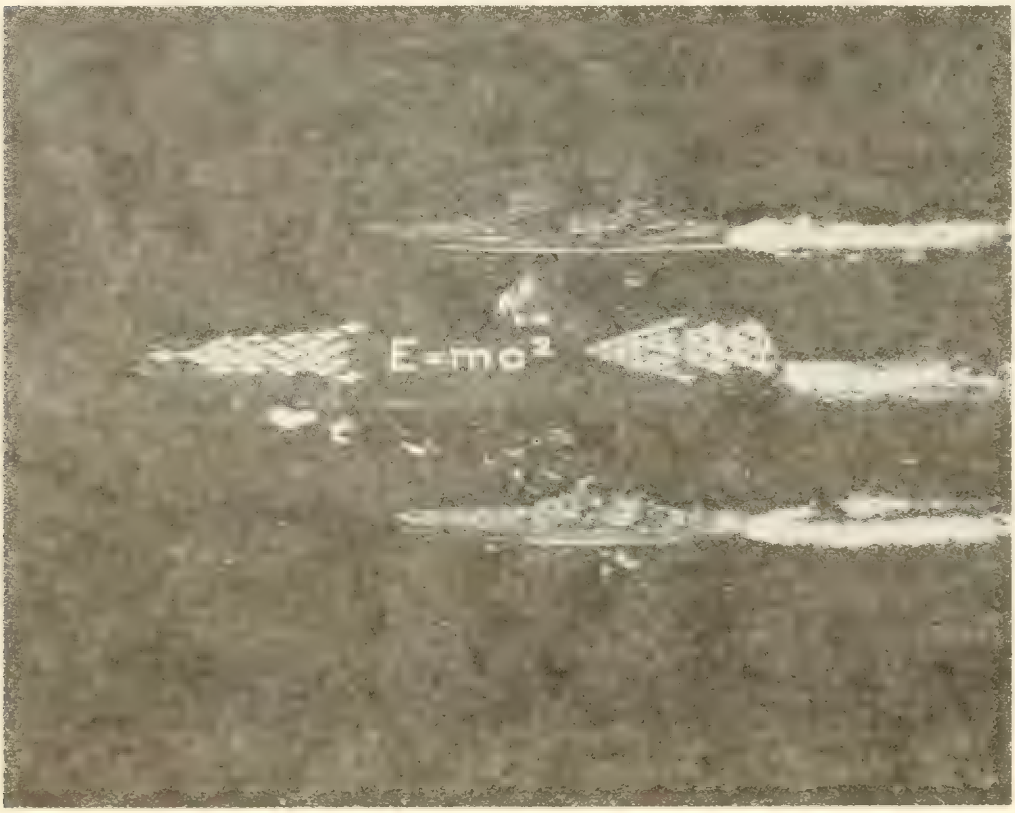
USS SOUTH CAROLINA (CGN 37) Underway in the Indian Ocean

OPERATIONS

Specific details of Naval nuclear-powered warship operations are classified. They cover a wide variety of activities, including thousands of ballistic missile submarine deterrent patrols; offensive and defensive exercises with other U.S. Navy and Allied units; intelligence gathering; amphibious support; escort service; special forces support; and as key elements in task force deployments to troublespots around the world. The following examples are a matter of public record, and illustrate the versatility and endurance of nuclear-powered warships.

Operation Sea Orbit

On July 31, 1964, ENTERPRISE, LONG BEACH, and BAINBRIDGE departed the Mediterranean for a 65-day, 30,000-mile around-the-world cruise to be carried out completely free from refueling or logistic support while operating at a normal tempo. The three ships, traveling under all kinds of weather conditions, made the 5115-mile transit from Australia to Cape Horn at an average speed of better than 25 knots—demonstrating the capability of nuclear-powered surface ships to reinforce quickly U.S. power in remote areas and operate over great distance at high speeds without logistic support.



USS ENTERPRISE (CVN 65), USS LONG BEACH (CGN 9), and USS BAINBRIDGE (CGN 25) Underway as Part of Operation Sea Orbit

Battle Group Charlie with USS CARL VINSON (CVN 70) in the Indian Ocean

Operations in the Indian Ocean and the Persian Gulf

Prompted by the 1979 seizure of the American Embassy in Iran and by the Soviet invasion of Afghanistan, the U. S. Navy began regularly sending carrier battle groups to the Indian Ocean to provide a strong military force in the area and to counter the Soviet naval presence in the region. Because Indian Ocean operations depend upon a complicated and lengthy supply chain, logistically independent nuclear-powered ships are particularly well-suited for deployment to the region. For example, during her 144-day Indian Ocean deployment in 1980, NIMITZ steamed over 30,000 miles without visiting a port, more than any U.S. Navy ship since World War II.

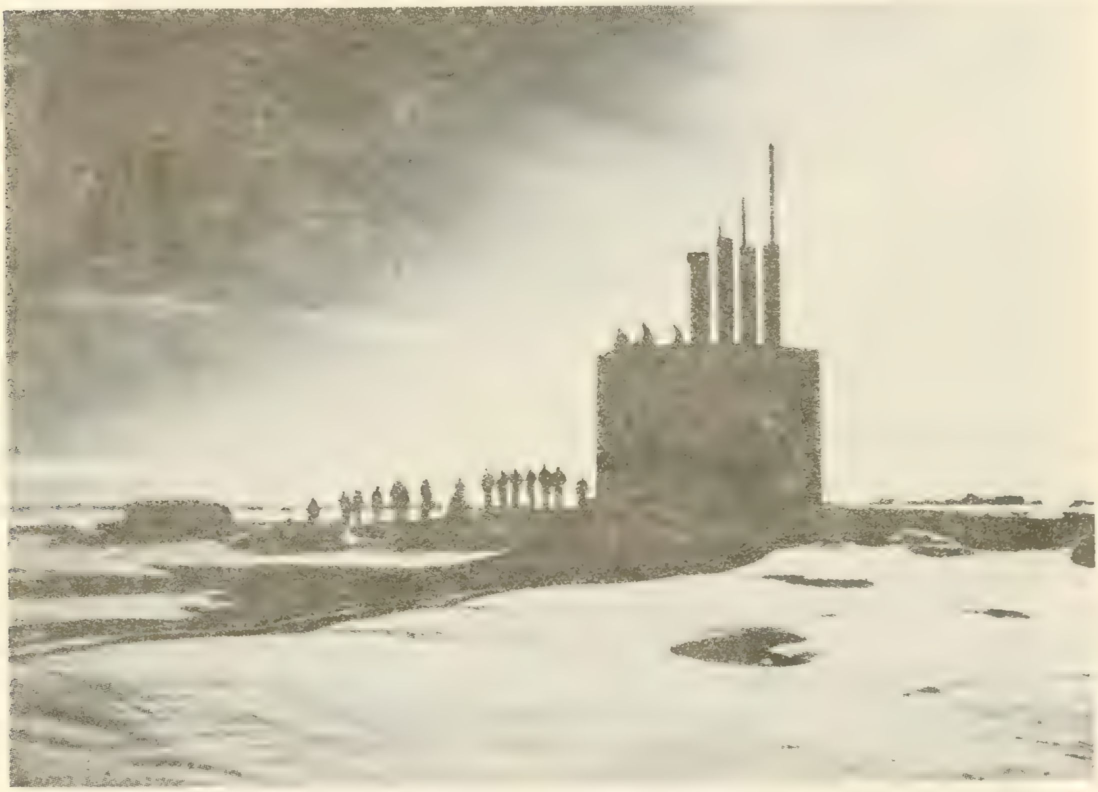
In August 1990, Iraq invaded Kuwait resulting in an unprecedented military buildup in the Persian Gulf region to support Operation Desert Shield. Within days of the Iraqi invasion, the USS DWIGHT D. EISENHOWER carrier battle group transited the Suez Canal from the Mediterranean to the Red Sea, representing some of the first U.S. military assets to arrive on the scene. Over a dozen U.S. attack submarines conducted surveillance, reconnaissance, and other missions before and during the hostilities. As Desert Shield became Desert Storm, at least two submarines and two nuclear-powered cruisers launched tomahawk cruise missiles against Iraq, and planes from the USS THEODORE ROOSEVELT participated in the air attack on Iraq.

The nuclear-powered cruiser, USS MISSISSIPPI, after returning home in July 1990 from months of anti-drug operations in the Caribbean, was abruptly directed to Desert Shield/Desert Storm operations. As a result, MISSISSIPPI and her crew spent 18 of 22 months at sea, the highest operating tempo of any ship in the U.S. Navy in the post World War II era.

Arctic Operations

Perhaps nowhere is the tactical flexibility provided by nuclear power more evident than in under-ice operations. Our Maritime Strategy calls for the Navy to engage an enemy as far forward as possible, which may require our submarines to operate from the Arctic region—alone and unsupported.

The first U.S. submarine Arctic operations were conducted in 1946 when the diesel-powered submarine, USS ATULE, conducted a brief excursion under the ice, limited by the need to recharge her batteries. In 1957, NAUTILUS became the first nuclear-powered submarine to operate under the ice, and in 1958 she conducted the first submerged transpolar crossing. In 1959, USS SKATE became the first ship to surface at the North Pole. In subsequent years, many U.S. nuclear-powered submarines have operated under, and surfaced through, the polar ice cap.



USS QUEENFISH (SSN 651) at the North Pole

Due to the unique and harsh environment of the polar region, a submarine operating under the ice must maneuver carefully, using special sonar equipment to avoid shifting ice packs, and keep track of clearances, not only below the ship, because the Arctic Ocean is quite shallow in many places, but above the ship as well, where thick ice extends downward. In addition, under-ice operations prevent submarine crews from relying on navigation satellites, commonly used in open waters to keep track of position, requiring instead the use of shipboard inertial navigation systems and computers which must be constantly updated through calculations based on the movement of the ship. Communication, if necessary in the Arctic, requires a submarine to locate an area of thin ice and then carefully break through to the surface.

In May 1986, three U.S. nuclear-powered submarines, USS RAY (SSN 653), USS HAWKBILL (SSN 666), and USS ARCHERFISH (SSN 678), rendezvoused and surfaced together at the geographic north pole. Their mission was to collect scientific data and test submarine force readiness without logistic base support. During their visit, crewmen from the three ships were given the opportunity to venture onto the polar ice and explore the area.

Arctic Rendezvous

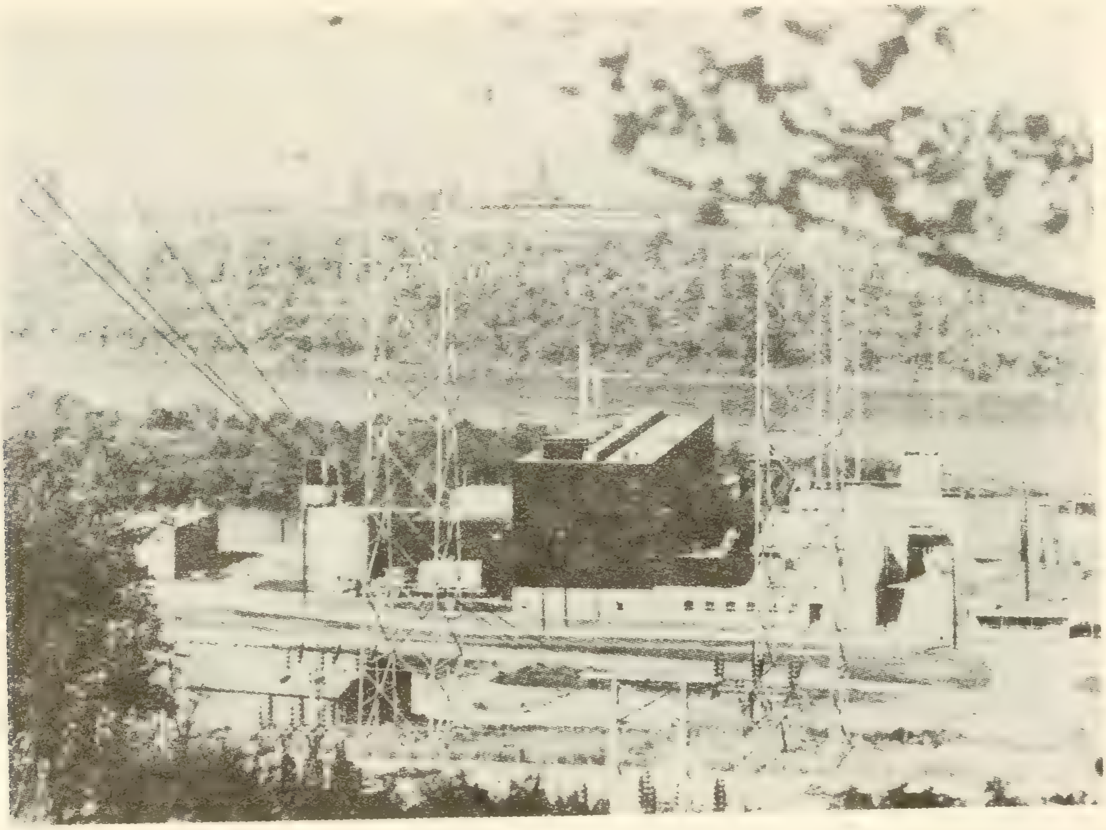
In addition to improving our under-ice operating ability, Arctic exercises demonstrate the United States' presence in the region and resolve that all sea areas remain open to free navigation. As our trips under the polar ice demonstrate, nuclear power has significantly augmented our ability to explore the far reaches of our planet.

SPECIAL PROJECTS

Shippingport

Because of the Program's successful work with power reactors, President Eisenhower assigned the Program responsibility for developing the Shippingport Atomic Power Station—the world's first full-scale atomic power plant solely for the production of electricity. Operated by the Duquesne Light Company, Shippingport's pressurized water reactor (PWR) design and original cores became prototypes for the majority of commercial nuclear power stations. Other Shippingport achievements include:

- Providing power to Duquesne Light Company customers from 1957-1974 with PWR design cores.
- Available for operation about 65 percent of its life—higher than most other commercial plants—despite numerous planned shutdowns for research and development purposes.
- First safeguards report for a nuclear power station.



Shippingport Atomic Power Station

Light Water Breeder Reactor (LWBR)

In the early 1960's, the AEC focused research and development efforts on liquid-metal breeder reactors which would generate more fissionable material than they would consume while producing power. Conventional wisdom was that breeding would not be possible in a PWR plant. The Program's successful development of a Light Water Breeder Reactor (LWBR) core at Shippingport dispelled that notion:

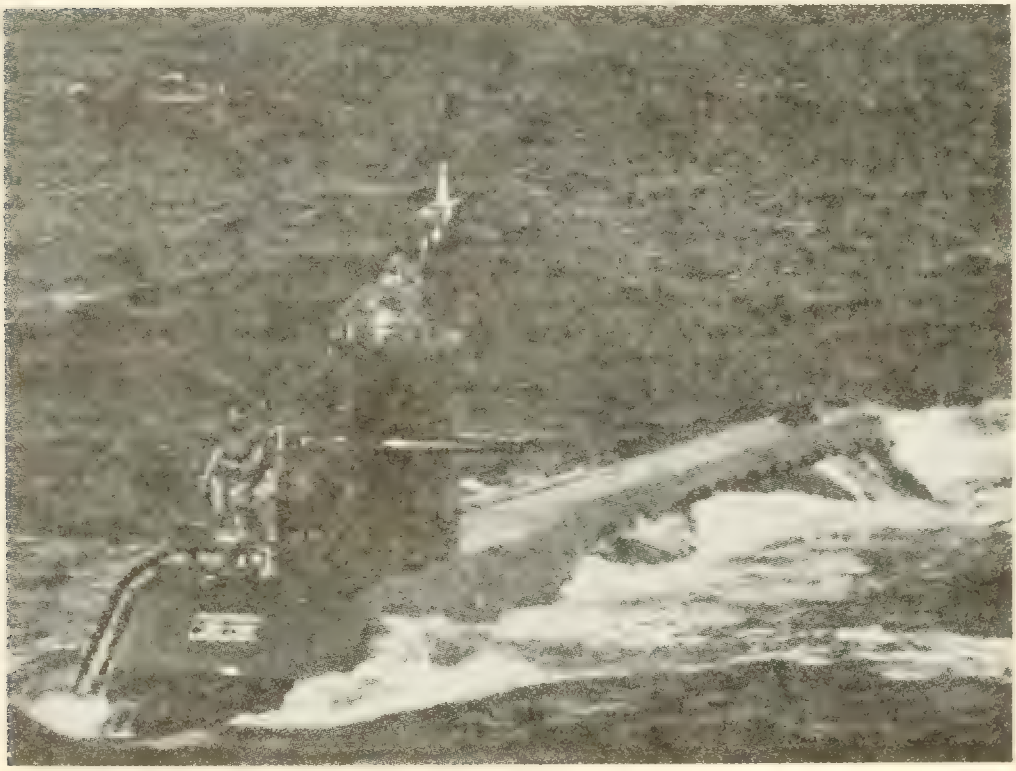
- In 1965, LWBR development began with uranium-233 as the "fissile" material, and thorium the "fertile" material.
- Successful use of thorium, a plentiful resource, would provide a source of energy many times greater than the known fossil fuel reserves.
- In 1977, the LWBR commenced operation at Shippingport, generating electricity for Duquesne Light Company for five years.
- The LWBR core was very reliable, achieving a level of on-line operation similar to its PWR predecessor.
- Extensive end-of-life testing confirmed LWBR had operated as designed. In fact, breeding occurred at a rate higher than predicted. Core material performance was excellent.
- LWBR technical reports were made available to the commercial nuclear power industry.

The Naval Nuclear Propulsion Program retained responsibility for Shippingport through end-of-life testing and defueling. In 1982, the Department of Energy decommissioned Shippingport, removing all radioactive components, and returning the site to "park land."

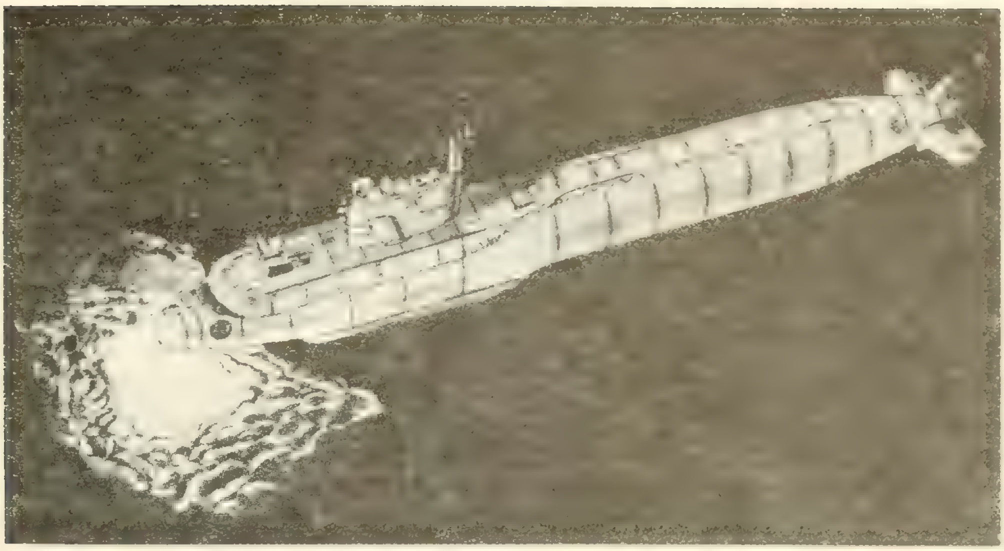
NR-1

In 1965, the Program began development of a nuclear-powered, deep-submergence research and ocean engineering vehicle, designated NR-1. The capability of this manned vehicle was to be far greater than any other vessel planned or developed at that time because of the vastly increased endurance and independence from surface support made possible by nuclear power. Launched at Electric Boat, Groton in January 1969, NR-1 provides valuable service to the Navy, other U.S. Government agencies, and research and educational institutions. In addition to its small nuclear propulsion plant which provides virtually limitless submerged endurance, NR-1's characteristics include:

- a 400-ton submerged displacement, 150-foot length, and 12-foot diameter
- 4-knot speed, twin-screw propulsion
- retractable bottoming wheels
- viewing ports, exterior lighting, and color television and still cameras for photographic studies
- an object recovery claw and manipulator with gripping and cutting capability.



NR-1 with Crew on the Surface



NR-1 Exploring the Ocean Floor (Artist's Conception)

NR-1 is equipped with sophisticated electronics and computers, to aid her navigation, communications, and object location and identification. She can maneuver or hold a steady position on or close to the seabed or underwater ridges to detect and identify objects at a considerable distance, and to lift objects off the ocean floor.

NR-1 carries a crew of five to ten specially trained Navy volunteers and two scientists. Able to remain submerged and move at maximum speed for extended periods of time, she performs detailed studies and mapping of the ocean bottom, including temperature, currents, and other oceanographic data for military, commercial, and scientific uses.

NR-1's missions have included large-area fisheries research for the Department of Interior to determine propagation, feeding, and habitat usage; studies of the mid-Atlantic ridge which have revealed large amounts of data on marine biology and plate tectonics; and studies of large hydrocarbon seeps in the Gulf of Mexico, which revealed previously unknown marine species and large areas of aquatic life in regions of mixing seawater and hydrocarbons.

NR-1's unique capability to remain on-site while mapping or searching an area is a valuable asset. In 1976, NR-1 participated in U.S. Navy operations to recover a Navy F-14 fighter and Phoenix air-to-air missile lost from a carrier. Following the loss of the Space Shuttle CHALLENGER in 1986, NR-1 joined several other undersea vehicles to search for, identify, and recover critical parts of CHALLENGER. Nuclear power enabled NR-1 to remain submerged and on station even when heavy weather forced all other search and recovery ships into port for days. In 1989, the National Oceanic and Atmospheric Administration (NOAA) used NR-1's unique capabilities to survey commercial disposal sites off the east coast of the U.S.

NR-1 continues to provide a valuable service to the Navy, other U.S. Government agencies, and research and educational institutions.

PROGRAM DIRECTORS—PAST AND PRESENT

Admiral Hyman G. Rickover, USN

Director: July 16, 1948 - January 31, 1982

Admiral Rickover, the Father of the Nuclear Navy, was born in Makow, Russia, on January 27, 1900. At the age of six, he emigrated with his parents to the United States, settling in Chicago, Illinois. Admiral Rickover entered the U.S. Naval Academy in 1918 and was commissioned an ensign in June 1922.

Following sea duty aboard USS LA VALLETTE (DD-315) and USS NEVADA (BB-36), Admiral Rickover attended Columbia University, where he earned the degree of Master of Science in Electrical Engineering. From 1929 to 1933, he qualified for submarine duty and command aboard the submarines S-9 and S-48. In June 1937, he assumed command of USS FINCH. Later that year, he was selected as an Engineering Duty Officer and spent the remainder of his career serving in that specialty.

During World War II, Admiral Rickover served as Head of the Electrical Section of the Bureau of Ships and later as Commanding Officer of the Naval Repair Base, Okinawa. In 1946, he was assigned to the Atomic Energy Commission laboratory at Oak Ridge, Tennessee and, in early 1949, to the Division of Reactor Development, U.S. AEC.

As director of the Naval Reactors Branch, Admiral Rickover developed the world's first nuclear-powered submarine, USS NAUTILUS (SSN 571), which went to sea in 1955. In the years that followed, Admiral Rickover directed all aspects of building and operating the nuclear fleet.

Admiral Rickover's numerous medals and decorations include the Distinguished Service Medal, Legion of Merit, Navy Commendation Medal, and the World War II Victory Medal. In recognition of his wartime service, he was made Honorary Commander of the Military Division of the Most Excellent Order of the British Empire.

Admiral Rickover was twice awarded the Congressional Gold Medal for exceptional public service. In 1980, President Jimmy Carter presented Admiral Rickover with the Presidential Medal of Freedom, the nation's highest non-military honor, for his contributions to world peace.

Admiral Rickover retired from the United States Navy on January 31, 1982, after over 63 years of service to his country and to 13 Presidents. His name is memorialized in the attack submarine USS HYMAN G. RICKOVER (SSN 709) and Rickover Hall at the U.S. Naval Academy. Admiral Rickover died on July 8, 1986, and is buried in Arlington National Cemetery.

Admiral Kinnaird R. McKee, USN

Director: February 1, 1982 - October 21, 1988

Admiral Kinnaird R. McKee was born in Louisville, Kentucky, on August 14, 1929, and graduated from the United States Naval Academy in 1951. He served in the Pacific fleet destroyer MARSHALL during the Korean War and in eight submarines of the Atlantic fleet since that time. After completion of submarine training in 1953, he served in three diesel-powered submarines: PICUDA, SEA CAT, and MARLIN. In 1956, Admiral McKee was ordered to command of USS X-1, a small experimental submarine. He graduated from nuclear power training in 1958 and joined the commissioning crew of SKIPJACK, the Navy's first high-performance nuclear-powered attack submarine. Assignment as Executive Officer of NAUTILUS followed in 1961, then of the SAM HOUSTON in late 1962. After three deterrent patrols on the SAM HOUSTON, he served in the Naval Reactors Division of the Atomic Energy Commission from 1964 to 1966.

Admiral McKee served as Commanding Officer of the nuclear-powered attack submarine DACE from 1966 through 1969. The ship was twice awarded the Navy Unit Commendation and three times the Battle Efficiency Pennant for operations during that period. Following command of DACE, Admiral McKee served in the office of the Director, Navy Program Planning, where his responsibilities included strategic warfare, research and development, and submarine and anti-submarine warfare systems. In 1970, he was assigned to the immediate staff of the Chief of Naval Operations, where he established the CNO Executive Panel. As Commander, Submarine Group Eight, Admiral McKee served as the NATO and U.S. Submarine Commander in the Mediterranean from 1973 to 1975. On August 1, 1975, he became the forty-eighth Superintendent of the U.S. Naval Academy. Promoted to three-star rank in March 1978, Admiral McKee served as Commander, Third Fleet with headquarters in Pearl Harbor from September 1978 to October 1979. He was then assigned as Director, Naval Warfare, Office of the Chief of Naval Operations concurrent with the expansion of the directorate from its original concentration on anti-submarine warfare to responsibility for all aspects of naval warfare. He developed and implemented the new organization.

On February 1, 1982, he relieved Admiral H. G. Rickover as the Director, Naval Nuclear Propulsion. On March 2, 1982, he was confirmed by the U.S. Senate for promotion to four-star rank.

Admiral McKee retired on October 31, 1988, after 41 years of service to his country.

Admiral McKee's decorations include the Distinguished Service Medal, five awards of the Legion of Merit, and three awards of the Navy Unit Commendation.

Admiral Bruce DeMars, USN

Director: October 22, 1988 - Present

Admiral Bruce DeMars was born in Chicago, Illinois, on June 3, 1935, and graduated from the United States Naval Academy in 1957. Following commissioning, he served in the attack transports USS TELFAIR and USS OKANOGAN and, after Submarine School, the diesel-electric submarine USS CAPITAINE. Following nuclear power training, he served in the nuclear-powered submarines USS GEORGE WASHINGTON, USS SNOOK, and USS STURGEON before reporting for duty as Commanding Officer of USS CAVALLA.

Shore duty tours included instructor duty at Nuclear Power School and Submarine School and attendance at the Armed Forces Staff College. Following staff duty with Squadron TEN, Admiral DeMars served as Senior Member of the Nuclear Propulsion Examining Board, U.S. Atlantic Fleet. He commanded Submarine Development Squadron TWELVE in New London, Connecticut and then served as Deputy Director, Attack Submarine Division in the Office of the Chief of Naval Operations, until selected for promotion to Rear Admiral in 1981.

As a flag officer, Admiral DeMars served as Commander, U.S. Naval Forces Marianas/Commander, U.S. Naval Base Guam; as Commander in Chief, Pacific Representative for Guam and the Trust Territory of the Pacific Islands; and as Deputy Assistant Chief and then Deputy Chief of Naval Operations for Submarine Warfare.

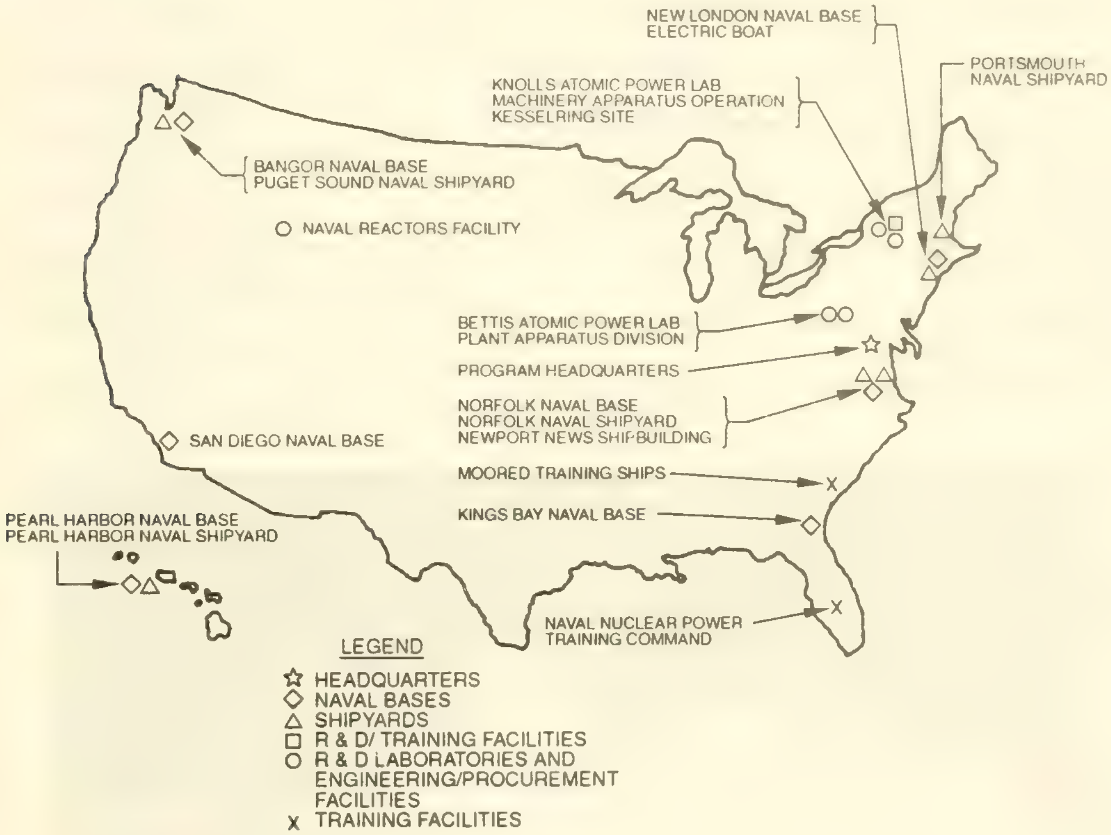
On October 22, 1988, he relieved Admiral McKee as Director, Naval Nuclear Propulsion. On September 30, 1988, he was confirmed by the U.S. Senate for promotion to four-star rank.

As Director, Naval Nuclear Propulsion, Admiral DeMars is also the Deputy Assistant Secretary for Naval Reactors (Department of Energy); Deputy Commander for Nuclear Propulsion (Naval Sea Systems Command); and Assistant to the Chief of Naval Operations for Naval Reactors.

Admiral DeMars' decorations include the Distinguished Service Medal, four awards of the Legion of Merit, two awards of the Meritorious Service Medal, two awards of the Navy Commendation Medal, the Navy Achievement Medal, and the Navy Unit Commendation.

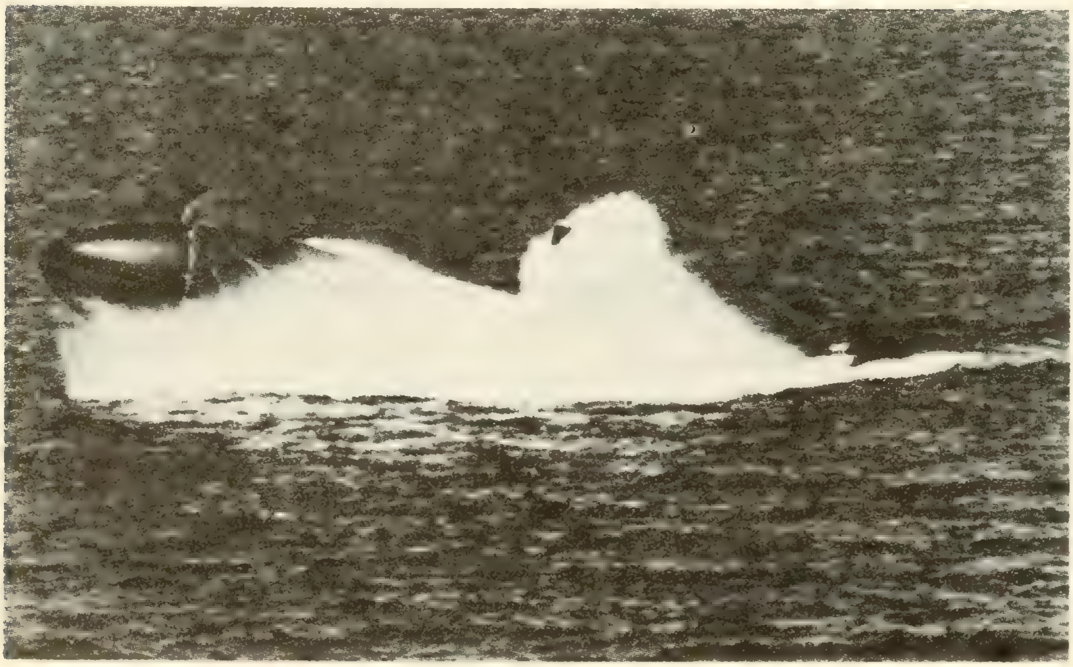
PROGRAM LOCATIONS

As seen in the following map, Naval Nuclear Propulsion Program activities can be found throughout the United States. From the shipyard at Portsmouth, New Hampshire to the submarine base at Pearl Harbor, Hawaii; from the training center at Orlando, Florida to the TRIDENT base at Bangor, Washington, Program interests criss-cross the nation. With submarine tenders located in Guam and La Maddalena, Italy, and U.S. nuclear-powered vessels welcome in numerous ports throughout the world, the Navy's Nuclear Propulsion Program is truly global in scope.



PROGRAM STATISTICS
(As of June 1995)

Active Nuclear-Powered Ships:	115
Active Nuclear-Powered Submarines:	101
Active Nuclear-Powered Cruisers:	6
Active Nuclear-Powered Carriers:	7
Active Nuclear-Powered Research Vessels:	1
Number of Miles Steamed on Nuclear Power:	Over 100,000,000
Total Number of Reactors Operated to Date:	232
Number of Reactors Currently in Operation:	139
Number of Reactor-Years of Operation:	Over 4500
Number of Officers Trained or in Training:	Over 16,000
Number of Enlisted Men Trained or in Training:	Over 76,000



A 688 Class Attack Submarine Performing an Emergency Surface

U. S. NUCLEAR-POWERED SHIP PROGRAM SUMMARY

	Authorized By Congress	Under Construction	Commissioned	Decommissioned
SEAWOLF (SSN 21) Class	2	2	0	0
USS LOS ANGELES (SSN 688) Class	62	4	57	1
Other Fast Attack Submarines	68	0	29*	41
Total Fast Attack Submarines	**132**	**6**	**86**	**42**
TRIDENT/USS OHIO (SSBN 726) Class	18	3	15	0
POLARIS/POSEIDON submarines	41	0	0	39*
Total Ballistic Missile Submarines	**59**	**3**	**15**	**39**
Total Submarines	**191**	**9**	**101**	**81**
Research Vessels (NR-1)	**1**	**0**	**1**	**0**
Nuclear-Powered Aircraft Carriers	10	3	7	0
Nuclear-Powered Guided Missile Cruisers	9	0	6	3
Total Nuclear-Powered Surface Ships	**19**	**3**	**13**	**3**
Total Nuclear-Powered Ships	**211**	**12**	**115**	**84**

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*Two ships originally authorized by Congress as Fleet Ballistic Missile submarines are currently operating as fast attack submarines.

U. S. NUCLEAR-POWERED SUBMARINES

SSN — Fast Attack Submarine

SSBN — Ballistic Missile Submarine

Hull No.	Name	Class	Builder	Shipbuilding Program FY	Keel Laid	Launched	Commissioned	Decommissioned
SSN 571	NAUTILUS	571	Electric Boat	1952	6-14-52	1-21-54	9-30-54	3-3-80
SSN 575	SEAWOLF	575	Electric Boat	1953	9-15-53	7-21-55	3-30-57	3-31-87
SSN 578	SKATE	578	Electric Boat	1955	7-21-55	5-16-57	12-23-57	9-12-86
SSN 579	SWORDFISH	578	Portsmouth	1955	1-25-56	8-27-57	9-15-58	6-2-89
SSN 583	SARGO	578	Mare Island	1956	2-21-56	10-10-57	10-1-58	2-26-88
SSN 584	SEADRAGON	578	Portsmouth	1956	6-20-56	8-16-58	12-5-59	6-12-84
SSN 585	SKIPJACK	585	Electric Boat	1956	5-29-56	5-26-58	4-15-59	4-19-90
SSN 586	TRITON	586	Electric Boat	1956	5-29-56	8-19-58	11-10-59	5-3-69
SSN 587	HALIBUT	587	Mare Island	1956	4-11-57	1-9-59	1-4-60	6-30-76
SSN 588	SCAMP	585	Mare Island	1957	1-23-59	10-8-60	6-5-61	4-28-88
SSN 589	SCORPION	585	Electric Boat	1957	8-20-58	12-19-59	7-29-60	Lost at sea on 5-21-68
SSN 590	SCULPIN	585	Ingalls	1957	2-3-58	3-31-60	6-1-61	8-3-90
SSN 591	SHARK	585	Newport News	1957	2-24-58	3-16-60	2-9-61	9-11-90
SSN 592	SNOOK	585	Ingalls	1957	4-7-58	10-31-60	10-24-61	10-8-86
SSN 593	THRESHER	594	Portsmouth	1957	5-28-58	7-9-60	8-3-61	Lost at sea on 4-10-63
SSN 594	PERMIT	594	Mare Island	1958	7-16-59	7-1-61	5-29-62	7-18-91
SSN 595	PLUNGER	594	Mare Island	1958	3-2-60	12-9-61	11-21-62	1-3-90
SSN 596	BARB	594	Ingalls	1958	11-9-59	2-12-62	8-24-63	12-20-89
SSN 597	TULLIBEE	597	Electric Boat	1958	5-26-58	4-27-60	11-9-60	6-25-88
SSBN 598	GEORGE WASHINGTON	598	Electric Boat	1958	11-1-57	6-9-59	12-30-59	1-24-85
SSBN 599	PATRICK HENRY	598	Electric Boat	1958	5-26-58	9-22-59	4-9-60	5-25-84
SSBN 600	THEODORE ROOSEVELT	598	Mare Island	1958	5-28-58	10-3-59	2-13-61	2-28-81
SSBN 601	ROBERT E. LEE	598	Newport News	1959	8-25-58	12-18-59	9-16-60	11-30-83
SSBN 602	ABRAHAM LINCOLN	598	Portsmouth	1959	11-1-58	5-14-60	3-8-61	2-28-81
SSN 603	POLLACK	594	NY Shipbuilding	1959	3-14-60	3-17-62	5-26-64	3-1-89
SSN 604	HADDO	594	NY Shipbuilding	1959	9-9-60	8-18-62	12-16-64	6-12-91
SSN 605	JACK	594	Portsmouth	1959	9-16-60	4-24-63	3-31-67	7-11-90
SSN-606	TINOSA	594	Portsmouth	1959	11-24-59	12-9-61	10-17-64	1-15-92
SSN 607	DACE	594	Ingalls	1959	6-6-60	8-18-62	4-4-64	12-2-88
SSBN 608	ETHAN ALLEN	608	Electric Boat	1959	9-14-59	11-22-60	8-8-61	3-31-83

Hull No.	Name	Class	Builder	Shipbuilding Program FY	Keel Laid	Launched	Commissioned	Decommissioned
SSBN 609	SAM HOUSTON	608	Newport News	1959	12-28-59	2-2-61	3-6-62	9-20-91
SSBN 610	THOMAS A. EDISON	608	Electric Boat	1959	3-15-60	6-15-61	3-10-62	11-30-83
SSBN 611	JOHN MARSHALL	608	Newport News	1959	4-4-60	7-15-61	5-21-62	7-22-92
SSN 612	GUARDFISH	594	NY Shipbuilding	1960	2-28-61	5-15-65	12-20-66	2-4-92
SSN 613	FLASHER	594	Electric Boat	1960	4-14-61	6-22-63	7-22-66	5-26-92
SSN 614	GREENLING	594	Quincy	1960	8-15-61	4-4-64	11-3-67	4-18-94
SSN 615	GATO	594	Quincy	1960	12-15-61	5-14-64	1-25-68	
SSBN 616	LAFAYETTE	616	Electric Boat	1961	1-17-61	5-8-62	4-23-63	8-12-91
SSBN 617	ALEXANDER HAMILTON	616	Electric Boat	1961	6-26-61	8-18-62	6-27-63	2-23-93
SSBN 618	THOMAS JEFFERSON	608	Newport News	1961	2-3-61	2-24-62	1-4-63	1-24-85
SSBN 619	ANDREW JACKSON	616	Mare Island	1961	4-26-61	9-15-62	7-3-63	8-28-89
SSBN 620	JOHN ADAMS	616	Portsmouth	1961	5-19-61	1-12-63	5-12-64	3-24-89
SSN 621	HADDOCK	594	Ingalls	1961	4-24-61	5-21-66	12-22-67	4-7-93
SSBN 622	JAMES MONROE	616	Newport News	1961	7-31-61	8-4-62	12-7-63	9-25-90
SSBN 623	NATHAN HALE	616	Electric Boat	1961	10-2-61	1-12-63	11-23-63	11-3-86
SSBN 624	WOODROW WILSON	616	Mare Island	1961	9-13-61	2-22-63	12-27-63	9-1-94
SSBN 625	HENRY CLAY	616	Newport News	1961	10-23-61	11-30-62	2-20-64	11-6-90
SSBN 626	DANIEL WEBSTER[1]	616	Electric Boat	1961	12-28-61	4-27-63	4-9-64	2-4-93
SSBN 627	JAMES MADISON	627	Newport News	1962	3-5-62	3-15-63	7-28-64	11-20-92
SSBN 628	TECUMSEH	627	Electric Boat	1962	6-1-62	6-22-63	5-29-64	7-23-93
SSBN 629	DANIEL BOONE	627	Mare Island	1962	2-6-62	6-22-63	4-23-64	2-4-94
SSBN 630	JOHN C. CALHOUN	627	Newport News	1962	6-4-62	6-22-63	9-15-64	3-11-94
SSBN 631	ULYSSES S. GRANT	627	Electric Boat	1962	8-18-62	11-2-63	7-17-64	6-12-92
SSBN 632	VON STEUBEN	627	Newport News	1962	9-4-62	10-18-63	9-30-64	2-26-94
SSBN 633	CASIMIR PULASKI	627	Electric Boat	1962	1-12-63	2-1-64	8-14-64	3-7-94
SSBN 634	STONEWALL JACKSON	627	Mare Island	1962	7-4-62	11-30-63	8-26-64	2-9-95
SSBN 635	SAM RAYBURN[1]	627	Newport News	1962	12-3-62	12-20-63	12-2-64	8-28-89
SSBN 636	NATHANAEL GREENE	627	Portsmouth	1962	5-21-62	5-12-64	12-19-64	12-12-86
SSN 637	STURGEON	637	Electric Boat	1962	8-10-63	2-26-66	3-3-67	8-1-94
SSN 638	WHALE	637	Quincy	1962	5-27-64	10-14-66	10-12-68	
SSN 639	TAUTOG	637	Ingalls	1962	1-27-64	4-15-67	8-17-68	
SSBN 640	BENJAMIN FRANKLIN	640	Electric Boat	1963	5-25-63	12-5-64	10-22-65	11-23-93

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[1] Removed from sea-going service and converted to training platforms: Moored Training Ship MTS 635 in 1989 and Moored Training Ship MTS-626 in 1993.

Hull No.	Name	Class	Builder	Shipbuilding Program FY	Keel Laid	Launched	Commissioned	Decommissioned
SSBN 641	SIMON BOLIVAR	640	Newport News	1963	4-17-63	8-22-64	10-29-65	2-24-95
SSBN 642	KAMEHAMEHA[1]	640	Mare Island	1963	5-2-63	1-16-65	12-10-65	
SSBN 643	GEORGE BANCROFT	640	Electric Boat	1963	8-24-63	3-20-65	1-22-66	9-21-93
SSBN 644	LEWIS AND CLARK	640	Newport News	1963	7-29-63	11-21-64	12-22-65	8-1-92
SSBN 645	JAMES K. POLK[2]	640	Electric Boat	1963	11-23-63	5-22-65	4-16-66	
SSN 646	GRAYLING	637	Portsmouth	1963	5-12-64	6-22-67	10-11-69	
SSN 647	POGY	637	NY Shipbuilding/ Ingalls	1963	5-4-64	6-3-67	5-15-71	
SSN 648	ASPRO	637	Ingalls	1963	11-23-64	11-29-67	2-20-69	3-31-95
SSN 649	SUNFISH	637	Quincy	1963	1-15-65	10-14-66	3-15-69	
SSN 650	PARGO	637	Electric Boat	1963	6-3-64	9-17-66	1-5-68	4-14-95
SSN 651	QUEENFISH	637	Newport News	1963	5-11-64	2-25-66	12-6-66	11-8-91
SSN 652	PUFFER	637	Ingalls	1963	2-8-65	3-30-68	8-9-69	
SSN 653	RAY	637	Newport News	1963	1-4-65	6-21-66	4-12-67	3-16-93
SSBN 654	GEORGE C. MARSHALL	640	Newport News	1964	3-2-64	5-21-65	4-29-66	9-24-92
SSBN 655	HENRY L. STIMSON	640	Electric Boat	1964	4-4-64	11-13-65	8-20-66	5-5-93
SSBN 656	GEORGE WASHINGTON CARVER	640	Newport News	1964	8-24-64	8-14-65	6-15-66	3-18-93
SSBN 657	FRANCIS SCOTT KEY	640	Electric Boat	1964	12-5-64	4-23-66	12-3-66	9-7-93
SSBN 658	MARIANO G. VALLEJO	640	Mare Island	1964	7-7-64	10-23-65	12-16-66	3-9-95
SSBN 659	WILL ROGERS	640	Electric Boat	1964	3-20-65	7-21-66	4-1-67	4-12-93
SSN 660	SAND LANCE	637	Portsmouth	1964	1-15-65	11-11-69	9-25-71	
SSN 661	LAPON	637	Newport News	1964	7-26-65	12-16-66	12-14-67	8-18-92
SSN 662	GURNARD	637	Mare Island	1964	12-22-64	5-20-67	12-6-68	4-28-95
SSN 663	HAMMERHEAD	637	Newport News	1964	11-29-65	4-14-67	6-28-68	4-5-95
SSN 664	SEA DEVIL	637	Newport News	1964	4-12-66	10-5-67	1-30-69	10-16-91
SSN 665	GUITARRO	637	Mare Island	1965	12-9-65	7-27-68	9-9-72	5-29-92
SSN 666	HAWKBILL	637	Mare Island	1965	9-12-66	4-12-69	2-4-71	
SSN 667	BERGALL	637	Electric Boat	1965	4-16-66	2-17-68	6-13-69	
SSN 668	SPADEFISH	637	Newport News	1965	12-21-66	5-15-68	8-14-69	
SSN 669	SEA HORSE	637	Electric Boat	1965	8-13-66	6-15-68	9-19-69	
SSN 670	FINBACK	637	Newport News	1965	6-26-67	12-7-68	2-4-70	
SSN 671	NARWHAL	671	Electric Boat	1964	1-17-66	9-9-67	7-12-69	
SSN 672	PINTADO	637	Mare Island	1966	10-27-67	8-16-69	9-11-71	
SSN 673	FLYING FISH	637	Electric Boat	1966	6-30-67	5-17-69	4-29-70	

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[1] USS KAMEHAMEHA (SSBN 642) was redesignated as an attack submarine on 8-31-92.
[2] USS JAMES K. POLK (SSBN 645) was redesignated as an attack submarine on 10-1-93.

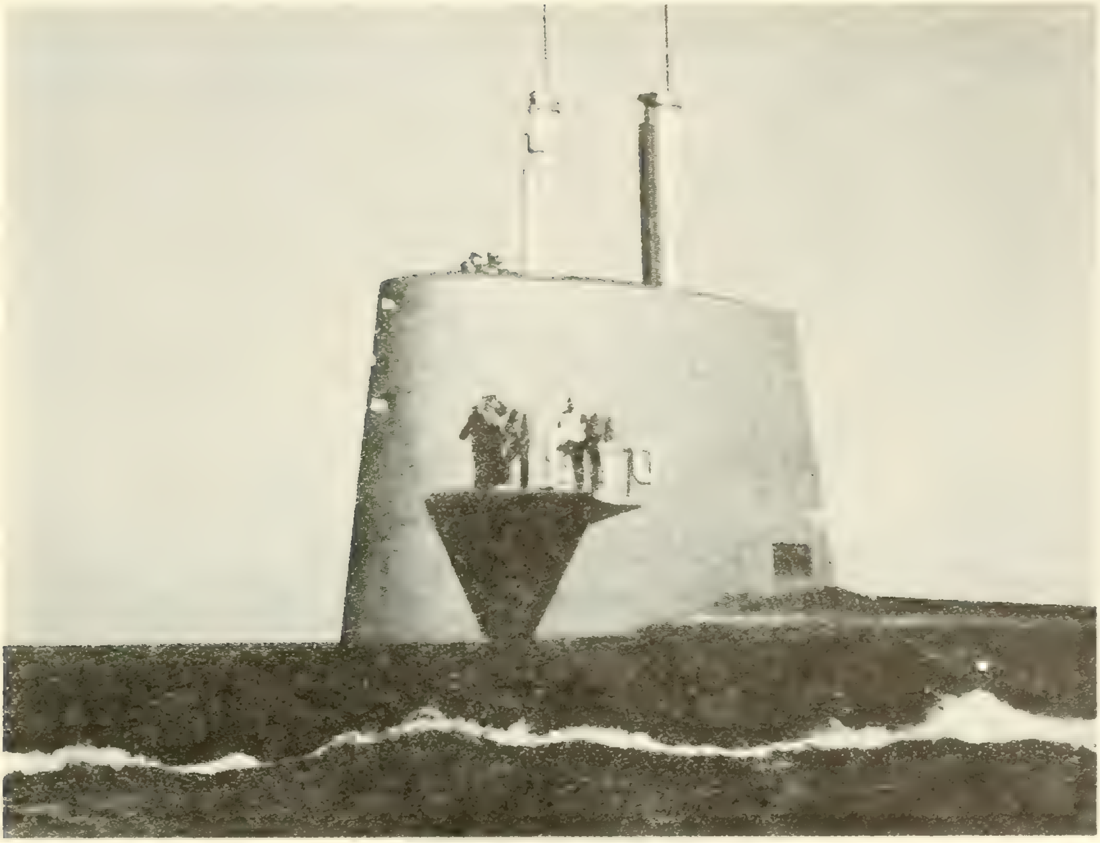
Hull No.	Name	Class	Builder	Shipbuilding Program FY	Keel Laid	Launched	Commissioned	Decommissioned
SSN 674	TREPANG	637	Electric Boat	1966	10-28-67	9-27-69	8-14-70	
SSN 675	BLUEFISH	637	Electric Boat	1966	3-13-68	1-10-70	1-8-71	
SSN 676	BILLFISH	637	Electric Boat	1966	9-20-68	5-1-70	3-12-71	
SSN 677	DRUM	637	Mare Island	1966	8-20-68	5-23-70	4-15-72	
SSN 678	ARCHERFISH	637	Electric Boat	1967	6-19-69	1-16-71	12-17-71	
SSN 679	SILVERSIDES	637	Electric Boat	1967	10-13-69	6-4-71	5-5-72	7-22-94
SSN 680	WILLIAM H. BATES	637	Ingalls	1967	8-4-69	12-11-71	5-5-73	
SSN 681	BATFISH	637	Electric Boat	1967	2-9-70	10-9-71	9-1-72	
SSN 682	TUNNY	637	Ingalls	1967	5-22-70	6-10-72	1-26-74	
SSN 683	PARCHE	637	Ingalls	1968	12-10-70	1-13-73	8-17-74	
SSN 684	CAVALLA	637	Electric Boat	1968	6-4-70	2-19-72	2-9-73	
SSN 685	GLENARD P. LIPSCOMB	685	Electric Boat	1968	6-5-71	8-4-73	12-21-74	7-11-90
SSN 686	L. MENDEL RIVERS	637	Newport News	1969	6-26-71	6-2-73	2-1-75	
SSN 687	RICHARD B. RUSSELL	637	Newport News	1969	10-19-71	1-12-74	8-16-75	6-24-94
SSN 688	LOS ANGELES	688	Newport News	1970	1-8-72	4-6-74	11-13-76	
SSN 689	BATON ROUGE	688	Newport News	1970	11-18-72	4-26-75	6-25-77	1-13-95
SSN 690	PHILADELPHIA	688	Electric Boat	1970	8-12-72	10-19-74	6-25-77	
SSN 691	MEMPHIS	688	Newport News	1971	6-23-73	4-3-76	12-17-77	
SSN 692	OMAHA	688	Electric Boat	1971	1-27-73	2-21-76	3-11-78	
SSN 693	CINCINNATI	688	Newport News	1971	4-6-74	2-19-77	6-10-78	
SSN 694	GROTON	688	Electric Boat	1971	8-3-73	10-9-76	7-8-78	
SSN 695	BIRMINGHAM	688	Newport News	1972	4-26-75	10-29-77	12-16-78	
SSN 696	NEW YORK CITY	688	Electric Boat	1972	12-15-73	6-18-77	3-3-79	
SSN 697	INDIANAPOLIS	688	Electric Boat	1972	10-19-74	7-30-77	1-5-80	
SSN 698	BREMERTON	688	Electric Boat	1972	5-8-76	7-22-78	3-28-81	
SSN 699	JACKSONVILLE	688	Electric Boat	1972	2-21-76	11-18-78	5-16-81	
SSN 700	DALLAS	688	Electric Boat	1973	10-9-76	4-28-79	7-18-81	
SSN 701	LA JOLLA	688	Electric Boat	1973	10-16-76	8-11-79	10-24-81	
SSN 702	PHOENIX	688	Electric Boat	1973	7-30-77	12-8-79	12-19-81	
SSN 703	BOSTON	688	Electric Boat	1973	8-11-78	4-19-80	1-30-82	
SSN 704	BALTIMORE	688	Electric Boat	1973	5-21-79	12-13-80	7-24-82	
SSN 705	CITY OF CORPUS CHRISTI	688	Electric Boat	1973	9-4-79	4-25-81	1-8-83	
SSN 706	ALBUQUERQUE	688	Electric Boat	1974	12-27-79	3-13-82	5-21-83	

Hull No.	Name	Class	Builder	Shipbuilding Program FY	Keel Laid	Launched	Commissioned
SSN 707	PORTSMOUTH	688	Electric Boat	1974	5-8-80	9-18-82	10-1-83
SSN 708	MINNEAPOLIS-SAINT PAUL	688	Electric Boat	1974	1-30-81	3-19-83	3-10-84
SSN 709	HYMAN G. RICKOVER	688	Electric Boat	1974	7-24-81	8-27-83	7-21-84
SSN 710	AUGUSTA	688	Electric Boat	1974	4-1-82	1-21-84	1-19-85
SSN 711	SAN FRANCISCO	688	Newport News	1975	5-26-77	10-27-79	4-24-81
SSN 712	ATLANTA	688	Newport News	1975	8-17-78	8-16-80	3-6-82
SSN 713	HOUSTON	688	Newport News	1975	1-29-79	3-21-81	9-25-82
SSN 714	NORFOLK	688	Newport News	1976	8-1-79	10-31-81	5-21-83
SSN 715	BUFFALO	688	Newport News	1976	1-25-80	5-8-82	11-5-83
SSN 716	SALT LAKE CITY	688	Newport News	1977	8-26-80	10-16-82	5-12-84
SSN 717	OLYMPIA	688	Newport News	1977	3-31-81	4-30-83	11-17-84
SSN 718	HONOLULU	688	Newport News	1977	11-10-81	9-24-83	7-6-85
SSN 719	PROVIDENCE	688	Electric Boat	1978	10-14-82	8-4-84	7-27-85
SSN 720	PITTSBURGH	688	Electric Boat	1979	4-15-83	12-8-84	11-23-85
SSN 721	CHICAGO	688	Newport News	1980	1-5-83	10-13-84	9-27-86
SSN 722	KEY WEST	688	Newport News	1980	7-6-83	7-20-85	9-12-87
SSN 723	OKLAHOMA CITY	688	Newport News	1981	1-4-84	11-2-85	7-9-88
SSN 724	LOUISVILLE	688	Electric Boat	1981	9-16-84	12-14-85	11-8-86
SSN 725	HELENA	688	Electric Boat	1982	3-28-85	6-28-86	7-11-87
SSBN 726	OHIO	726	Electric Boat	1974	4-10-76	4-7-79	11-11-81
SSBN 727	MICHIGAN	726	Electric Boat	1975	4-4-77	4-26-80	9-11-82
SSBN 728	FLORIDA	726	Electric Boat	1975	4-9-77	11-14-81	6-18-83
SSBN 729	GEORGIA	726	Electric Boat	1976	4-7-79	11-6-82	2-11-84
SSBN 730	HENRY M. JACKSON	726	Electric Boat	1977	1-19-81	10-15-83	10-6-84
SSBN 731	ALABAMA	726	Electric Boat	1978	8-21-81	5-19-84	5-25-85
SSBN 732	ALASKA	726	Electric Boat	1978	3-9-83	1-12-85	1-25-86
SSBN 733	NEVADA	726	Electric Boat	1980	8-8-83	9-14-85	8-16-86
SSBN 734	TENNESSEE	726	Electric Boat	1981	6-9-86	12-13-86	12-17-88
SSBN 735	PENNSYLVANIA	726	Electric Boat	1983	3-2-87	4-23-88	9-9-89
SSBN 736	WEST VIRGINIA	726	Electric Boat	1984	12-18-87	10-14-89	10-20-90
SSBN 737	KENTUCKY	726	Electric Boat	1985	12-18-87	8-11-90	7-13-91
SSBN 738	MARYLAND	726	Electric Boat	1986	12-18-87	8-10-91	6-13-92
SSBN 739	NEBRASKA	726	Electric Boat	1987	12-18-87	8-15-92	7-10-93
SSBN 740	RHODE ISLAND	726	Electric Boat	1988	8-23-89	7-17-93	7-9-94
SSBN 741	MAINE	726	Electric Boat	1989	7-20-90	7-16-94	
SSBN 742	WYOMING	726	Electric Boat	1990	11-30-91		
SSBN 743	LOUISIANA	726	Electric Boat	1991	12-5-92		
SSN 750	NEWPORT NEWS	688	Newport News	1982	3-3-84	3-15-86	6-3-89
SSN 751	SAN JUAN	688	Electric Boat	1983	8-16-85	12-6-86	8-6-88

Hull No.	Name	Class	Builder	Shipbuilding Program FY	Keel Laid	Launched	Commissioned
SSN 752	PASADENA	688	Electric Boat	1983	12-20-85	9-12-87	2-11-89
SSN 753	ALBANY	688	Newport News	1984	4-22-85	6-13-87	4-7-90
SSN 754	TOPEKA	688	Electric Boat	1984	5-13-86	1-23-88	10-21-89
SSN 755	MIAMI	688	Electric Boat	1984	10-24-86	11-12-88	6-30-90
SSN 756	SCRANTON	688	Newport News	1985	8-29-86	7-3-89	1-26-91
SSN 757	ALEXANDRIA	688	Electric Boat	1985	6-19-87	6-23-90	6-29-91
SSN 758	ASHEVILLE	688	Newport News	1985	1-9-87	2-24-90	9-28-91
SSN 759	JEFFERSON CITY	688	Newport News	1985	9-21-87	8-17-90	2-29-92
SSN 760	ANNAPOLIS	688	Electric Boat	1986	6-15-88	5-18-91	4-11-92
SSN 761	SPRINGFIELD	688	Electric Boat	1986	10-28-88	11-9-91	12-4-92
SSN 762	COLUMBUS	688	Electric Boat	1986	4-28-89	8-1-92	7-24-93
SSN 763	SANTA FE	688	Electric Boat	1986	5-25-91	12-12-92	1-8-94
SSN 764	BOISE	688	Newport News	1987	8-25-88	3-23-91	11-7-92
SSN 765	MONTPELIER	688	Newport News	1987	5-19-89	8-23-91	3-13-93
SSN 766	CHARLOTTE	688	Newport News	1987	1-7-90	10-3-92	9-16-94
SSN 767	HAMPTON	688	Newport News	1987	6-30-90	4-3-92	11-6-93
SSN 768	HARTFORD	688	Electric Boat	1988	4-27-92	12-4-93	12-10-94
SSN 769	TOLEDO	688	Newport News	1988	4-8-91	8-28-93	2-24-95
SSN 770	TUCSON	688	Newport News	1988	9-20-91	3-19-94	
SSN 771	COLUMBIA	688	Electric Boat	1989	2-9-93	9-24-94	
SSN 772	GREENEVILLE	688	Newport News	1989	4-16-92	9-17-94	
SSN 773	CHEYENNE	688	Newport News	1990	10-6-92	4-1-95	
SSN 21	SEAWOLF	SSN 21	Electric Boat	1989	N/A		
SSN 22	CONNECTICUT	SSN 21	Electric Boat	1991	N/A		
Deep Submergence Research Vehicle							
NR-1			Electric Boat	1965		1-25-69	NA

U. S. NUCLEAR-POWERED SURFACE SHIPS

Hull No.	Name	Class	Builder	Shipbuilding Program FY	Keel Laid	Launched	Commissioned	Decommissioned
Nuclear-Powered Aircraft Carriers								
CVN 65	ENTERPRISE	65	Newport News	1958	2-4-58	9-24-60	11-25-61	
CVN 68	NIMITZ	68	Newport News	1967	6-22-68	5-13-72	5-3-75	
CVN 69	DWIGHT D. EISENHOWER	68	Newport News	1970	8-15-70	10-11-75	10-18-77	
[illegible]	CARL VINSON	68	Newport News	1974	10-11-75	3-15-80	3-13-82	
CVN 71	THEODORE ROOSEVELT	68	Newport News	1980	10-31-81	10-27-84	10-25-86	
CVN 72	ABRAHAM LINCOLN	68	Newport News	1983	11-3-84	2-13-88	11-11-89	
CVN 73	GEORGE WASHINGTON	68	Newport News	1983	8-25-86	7-21-90	7-4-92	
CVN 74	JOHN C. STENNIS	68	Newport News	1988	3-13-91	11-13-93		
CVN 75	HARRY S TRUMAN	68	Newport News	1988	11-29-93			
CVN 76	RONALD REAGAN	68	Newport News	1995				
Nuclear-Powered Cruisers								
CGN 9	LONG BEACH	9	Bethlehem	1957	12-2-57	7-14-59	9-9-61	5-1-95
CGN 25	BAINBRIDGE	25	Bethlehem	1959	5-15-59	4-15-61	10-6-62	
CGN 35	TRUXTUN	35	NY Shipbuilding	1962	6-17-63	12-19-64	5-27-67	
CGN 36	CALIFORNIA	36	Newport News	1967	1-23-70	9-22-71	2-16-74	
CGN 37	SOUTH CAROLINA	36	Newport News	1968	12-1-70	7-1-72	1-25-75	
CGN 38	VIRGINIA	38	Newport News	1970	8-19-72	12-14-74	9-11-76	11-10-94
CGN 39	TEXAS	38	Newport News	1971	8-18-73	8-9-75	9-10-77	7-16-93
CGN 40	MISSISSIPPI	38	Newport News	1972	2-22-75	7-31-76	8-5-78	
CGN 41	ARKANSAS	38	Newport News	1975	1-17-77	10-21-78	10-18-80	



USS SCULPIN (SSN 590) at Sea

Submarine at Sunset

PRINTED ON RECYCLED PAPER

USS CARL VINSON (CVN 70) Passing the ARIZONA Memorial, Pearl Harbor, Hawaii

Report NT-96-1
March 1996

ENVIRONMENTAL MONITORING AND DISPOSAL OF RADIOACTIVE WASTES FROM U.S. NAVAL NUCLEAR-POWERED SHIPS AND THEIR SUPPORT FACILITIES
1995

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ABSTRACT

The environmental effect of disposal of radioactive wastes originating from U.S. Naval nuclear propulsion plants and their support facilities is assessed. The total long-lived gamma radioactivity in liquids discharged to all ports and harbors from the one hundred twenty-one Naval nuclear-powered ships and supporting tenders, Naval bases and shipyards was less than 0.002 curie in 1995. This report confirms that procedures used by the Navy to control releases of radioactivity from U.S. Naval nuclear-powered ships and their support facilities are effective in protecting the environment and the health and safety of the general public. These procedures have ensured that no member of the general public has received measurable radiation exposure as a result of current operations of the Naval Nuclear Propulsion Program.

SUMMARY

The radioactivity in materials discussed in this report originates in the pressurized water reactors of U.S. Naval nuclear-powered ships. As of the end of 1995, the U.S. Navy had 96 nuclear-powered submarines, 12 nuclear-powered surface ships and two moored training ships in operation. Support facilities involved in construction, maintenance, overhaul and refueling of these nuclear propulsion plants include six shipyards, ten tenders and four submarine bases. Additionally, two other shipyards were inactivating radiological facilities to support shipyard closure. This report describes disposal of radioactive liquid, transportation and disposal of solid wastes, monitoring of the environment to determine the effect of radioactive releases, and updates reports on this subject issued by the Navy in references 1 through 5.* This report concludes that radioactivity associated with U.S. Naval nuclear-powered ships has had no significant or discernible effect on the quality of the environment. A summary of the radiological information supporting this conclusion follows:

From the start of the Naval Nuclear Propulsion Program, the policy of the U.S. Navy has been to reduce to the minimum practicable the amounts of radioactivity released into harbors. Since 1971, the total long-lived gamma radioactivity released each year within twelve miles from shore from all U.S. Naval nuclear-powered ships and their support facilities has been less than 0.002 curie; this includes all harbors both U.S. and foreign entered by these ships.

As a measure of the significance of these data, if one person were able to drink the entire amount of radioactivity discharged into any harbor in any of the last twenty-four years, that person would not exceed the annual radiation exposure permitted for an individual worker by the Nuclear Regulatory Commission.

Environmental monitoring is conducted by the U.S. Navy in U.S. and foreign harbors frequented by U.S. Naval nuclear-powered ships. This monitoring consists of analyzing harbor sediment, water and marine life samples for radioactivity associated with Naval nuclear propulsion plants, radiation monitoring around the perimeter of support facilities and effluent monitoring. Environmental samples from each of these harbors are also checked at least annually by a Department of Energy laboratory to ensure analytical procedures are correct and standardized.

Independent environmental monitoring has been conducted by the Environmental Protection Agency in U.S. harbors during the past several decades. The results of these extensive, detailed surveys have been consistent with Navy results. These surveys have again confirmed that U.S. Naval nuclear-powered ships and support facilities have had no significant effect on the radioactivity of the environment.

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*References are listed on page 32.

RADIOACTIVE LIQUID PROCESSING AND CONTROL

Policy and Procedures Minimizing Release of Radioactivity in Harbors

The policy of the U.S. Navy is to reduce to the minimum practicable the amounts of radioactivity released to the environment, particularly within twelve miles of shore including harbors. This policy is consistent with applicable recommendations issued by the Federal Radiation Council (incorporated into the Environmental Protection Agency in 1970), U.S. Nuclear Regulatory Commission, National Council on Radiation Protection and Measurements, International Commission on Radiological Protection, International Atomic Energy Agency, and National Academy of Sciences--National Research Council (references 6 through 15). Keeping releases small minimizes the radioactivity available to build up in the environment or to concentrate in marine life. To implement this policy of minimizing releases, the Navy has issued standard instructions defining radioactive release limits and procedures to be used by U.S. Naval nuclear-powered ships and their support facilities.

Source of Radioactivity

In the shipboard reactors, pressurized water circulating through the reactor core picks up the heat of nuclear reaction. The reactor cooling water circulates through a closed piping system to heat exchangers which transfer the heat to water in a secondary steam system isolated from the primary cooling water. The steam is then used as the source of power for the propulsion plant as well as for auxiliary machinery. Releases from the shipboard reactors occur primarily when reactor coolant water expands as a result of being heated to operating temperature; this coolant passes through a purification system ion exchange resin bed prior to being transferred from the ship.

The principal source of radioactivity in liquid effluents is trace amounts of corrosion and wear products from reactor plant metal surfaces in contact with reactor cooling water. Radionuclides with half-lives of approximately one day or greater in these corrosion and wear products include tungsten 187, chromium 51, hafnium 181, iron 59, iron 55, nickel 63, niobium 95, zirconium 95, tantalum 182, manganese 54, cobalt 58, and cobalt 60. The most predominant of these is cobalt 60, which has a 5.3 year half-life. Cobalt 60 also has the most restrictive concentration limit in water as listed by organizations which set radiological standards in references 6 and 7 for these corrosion and wear radionuclides. Therefore, cobalt 60 is the primary radionuclide of interest for naval nuclear propulsion plants.

Radioactivity Removal From Liquid at Shore Facilities

Radioactive liquids at shore facilities are collected in stainless steel tanks and processed through a processing system to remove most of the radioactivity (exclusive of tritium) prior to collection in a clean tank for reuse. Even after processing to approximately 10^{-8} microcuries of gamma radioactivity per milliliter, reactor coolant is reused rather than discharged. Figure 1 shows a simplified block diagram of the liquid processing system which consists of particulate filters, activated carbon bed filters, mixed hydrogen hydroxyl resin and colloid removal resin beds. This type of processing system has been developed and used successfully to produce high quality water containing very low radioactivity levels.

Liquid Releases in Harbors

The total amount of long-lived gamma radioactivity released into harbors and seas within twelve miles of shore have been less than 0.002 curie during each of the last twenty-five years. This total is for releases from U.S. Naval nuclear-powered ships and from the supporting shipyards, tenders and submarine bases, and at operating bases and home ports in the U.S. and overseas and all other U.S. and foreign ports which were visited by Naval nuclear-powered ships.

To put this small quantity of radioactivity into perspective, it is less than the quantity of naturally occurring radioactivity (reference 16) in the volume of saline harbor water occupied by a single nuclear-powered submarine.

Short-Lived Radionuclides

Reactor coolant also contains short-lived radionuclides with half-lives of seconds to hours. Their highest concentrations in reactor coolant are from nitrogen 16 (7 second half-life), nitrogen 13 (10 minute half-life), fluorine 18 (1.8 hour half-life), argon 41 (1.8 hour half-life) and manganese 56 (2.6 hour half-life). For the longest-lived of these, about one day after discharge from an operating reactor, the concentration is reduced to one thousandth of the initial concentration, and in about two days the concentration is reduced to one millionth. Further, essentially all of the water is transferred to shore facilities for processing and reuse rather than discharged. Consequently, these short-lived radionuclides are not important for liquid release considerations.

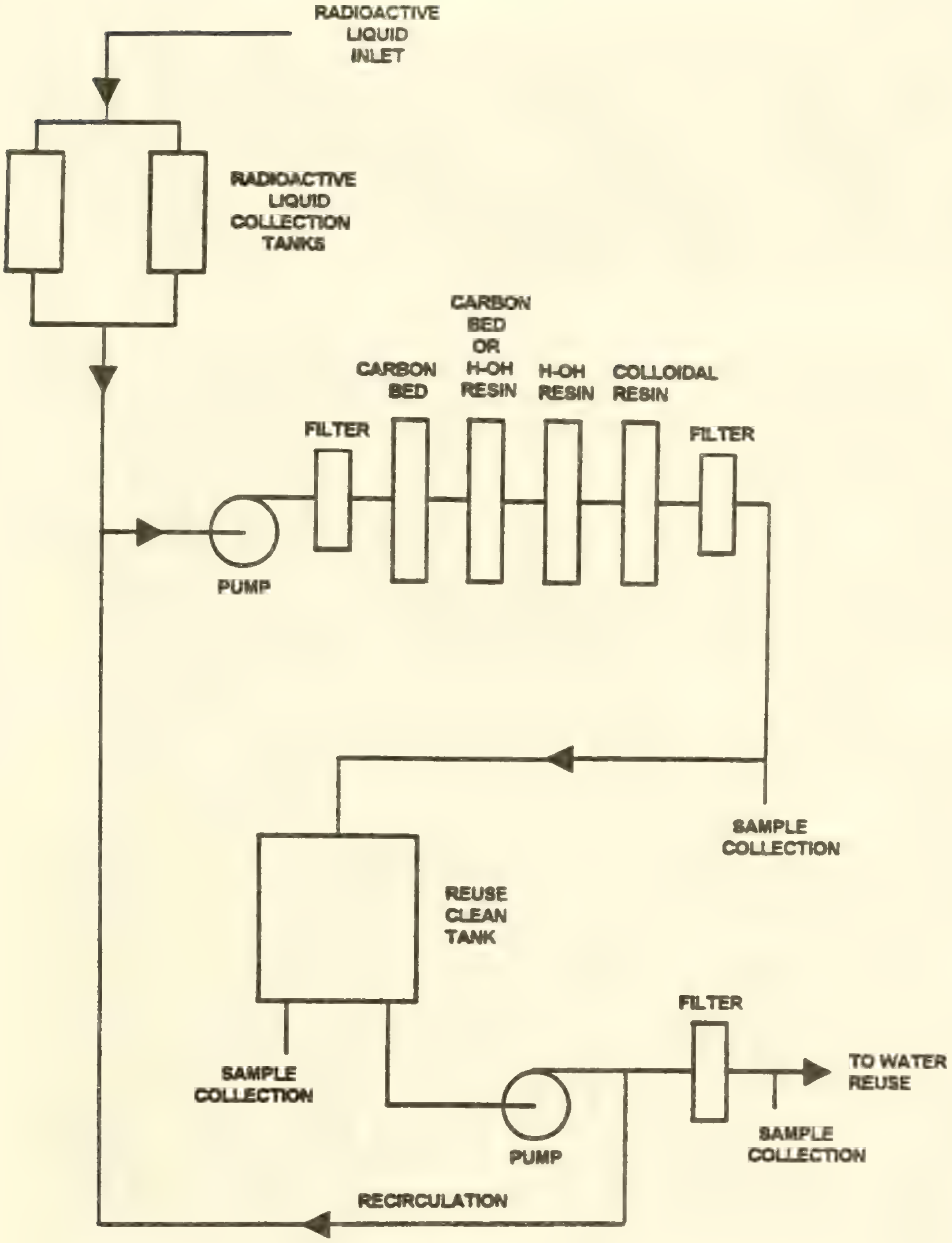


FIGURE 1
SIMPLIFIED DIAGRAM OF RADIOACTIVE LIQUID PROCESSING SYSTEM

Fission Product Radionuclides

Fission products produced in the reactor, including iodine and the fission gases krypton and xenon, are retained within the fuel elements. However, trace quantities of naturally occurring uranium impurities in reactor structural materials release small amounts of fission products to reactor coolant. The concentrations of fission products and the volumes of reactor coolant released are so low, however, that the total radioactivity attributed to long-lived fission product radionuclides comprises only a small fraction of the total long-lived gamma radioactivity releases discussed elsewhere in this section of this report.

Tritium

Small amounts of tritium are formed in reactor coolant systems as a result of neutron interaction with the approximately 0.015 percent of naturally occurring deuterium present in water, and other nuclear reactions. Although tritium has a twelve year half-life, the radiation produced is of such low energy that the radioactivity concentration guide issued by the International Commission on Radiological Protection, the National Council on Radiation Protection and Measurements, the U.S. Nuclear Regulatory Commission and by other standard-setting organizations is at least one hundred times higher for tritium than for cobalt 60. This tritium is in the oxide form and is chemically indistinguishable from water; therefore, it does not concentrate significantly in marine life or collect on sediment as do other radionuclides.

Tritium is naturally present in the environment because it is generated by cosmic radiation in the upper atmosphere. Reference 17 reports that the production rate from this source is about four million curies per year. This results in a global inventory of about seventy million curies of which about forty-five million curies are in the oceans (reference 18). Because of this naturally occurring tritium, much larger releases of tritium than are conceivable from Naval nuclear reactors would be required to make a measurable change in the background tritium concentration.

The total amount of tritium released annually from all U.S. Naval nuclear-powered ships and their supporting tenders, bases and shipyards has been less than two hundred curies. Most of this has been into the ocean greater than twelve miles from shore. The total tritium released annually from the entire nuclear Navy is less than single electrical generating nuclear power stations typically release each year (reference 19). Total tritium released annually into harbors within twelve miles of shore is less than one curie. Such releases are too small to increase measurably the tritium concentration in the environment. Therefore, tritium has not been combined with the data on other radionuclides in this section of this report.

Carbon 14

Carbon 14 is also formed in small quantities in reactor coolant systems as a result of neutron interactions with nitrogen and oxygen. Carbon 14 decays with a half-life of 5,730 years; however, only low energy beta radiation is emitted as a result of this decay process. As a result, the radioactivity concentration guide for carbon 14 in its chemical form in air issued by the International Commission on Radiological Protection, the National Council on Radiation Protection and Measurements, the U.S. Nuclear Regulatory Commission and by other standard-setting organizations is sixty times higher than for cobalt 60.

Carbon 14 occurs naturally in the environment. It is generated from cosmic radiation interactions with nitrogen and oxygen in the upper atmosphere and oxidized to form carbon dioxide. Carbon 14 is chemically indistinguishable from other isotopes of carbon. The carbon dioxide diffuses and convects throughout the atmosphere and enters the earth's carbon cycle. Reference 20 states that the earth's natural carbon 14 inventory is estimated to be about two hundred and fifty million curies of which approximately ninety-five percent resides in the oceans. The total amount of carbon 14 released annually from the operation of all U.S. Naval nuclear-powered ships and their supporting tenders, bases and shipyards has been less than one hundred curies which is far less than the natural carbon 14 production rate of forty thousand curies per year (reference 20). Since the inventory of naturally occurring carbon 14 is so large, it is extremely unlikely that releases from Naval nuclear reactors could result in a measurable change in the background concentration of carbon 14.

Liquid Releases at Sea

Radioactive liquids incidental to the operation of the nuclear propulsion plants are released at sea under strict controls. These ocean releases are consistent with recommendations the Council on Environmental Quality made in 1970 to the President in reference 21, and consistent with the Marine Protection, Research and Sanctuaries Act, reference 22. Procedures and limits for ocean releases have been consistent with recommendations made by the National Academy of Sciences--National Research Council in reference 10 and by the International Atomic Energy Agency in reference 11. These releases have contained much less radioactivity than these reports considered would be acceptable. Since 1975, the total long-lived gamma radioactivity released farther than twelve miles from shore by U.S. Naval nuclear-powered ships and supporting tenders has been less than or equal to 0.4 curie per year. This is the total amount released from over one hundred ships at different times of the year in the open sea at long distances from land in small incremental amounts, and under rapid dispersal conditions due to wave action. 0.4 curie is less than the naturally occurring radioactivity (reference 16) in a cube of sea water approximately one hundred yards on a side.

Loss of USS THRESHER and USS SCORPION

Two U.S. Naval nuclear-powered submarines have been lost at sea in the Atlantic Ocean. The submarine THRESHER sank 10 April 1963, 200 miles southeast of Maine in water 8,500 feet deep. The submarine SCORPION sank between 21 and 27 May 1968, 400 miles southwest of the Azores in more than 10,000 feet of water. The reactors used in all U.S. Naval submarines and surface ships are designed to minimize potential hazards to the environment even under the most severe casualty conditions such as the actual sinking of the ship. First, the reactor core is so designed that it is physically impossible for it to explode like a bomb. Second, the reactor fuel elements are made of materials that are extremely corrosion resistant, even in sea water. The reactor core could remain submerged in sea water for centuries without releases of fission products while the radioactivity decays, since the protective cladding on the fuel elements corrodes only a few millionths of an inch per year. Thus, in the event of a serious accident where the reactor is completely submerged in sea water, the fuel elements will remain intact for an indefinite period of time, and the radioactive material contained in these fuel elements should not be released. The maximum rate of release and dispersal of the radioactivity in the ocean, even if the protective cladding on the fuel were destroyed, would be so low as to be insignificant.

Radioactive material could be released from this type of reactor only if the fuel elements were actually to melt and, in addition, the high-strength, all-welded reactor system boundary were to rupture. The reactor's many protective devices and inherent self-regulating features are designed to prevent any melting of the fuel elements. Flooding of a reactor with sea water furnishes additional cooling for the fuel elements and so provides added protection against the release of radioactive fission products.

Radiation measurements, water samples, bottom sediment samples and debris collected from the area where THRESHER sank were analyzed for radioactivity shortly after the sinking and again in 1965 by various laboratories. Similarly, sea water and bottom sediment samples taken near SCORPION's hull were analyzed for radioactivity. In 1977, 1983 and 1986, followup samples of water, sediment, and marine life were collected from the immediate THRESHER debris areas. In 1979 and 1986, followup samples of water, sediment, marine life and debris were collected from the immediate SCORPION debris areas. None of these samples showed any evidence of release of radioactivity from the reactor fuel elements in either THRESHER or SCORPION. However, cobalt 60 released from both THRESHER and SCORPION coolant systems was detectable at low levels in the sediment samples in the debris areas. Cobalt 60 was not detectable in samples of water or marine life. The maximum cobalt 60 concentration measured in the sediment at either site was 1.16×10^{-6} uCi/gm and most samples were much less than this concentration. This is less than one-tenth of the concentration of naturally occurring radioactivity in the sediment. For perspective, if a person's diet contained cobalt 60 at the maximum concentration detected in the sediment, that person would receive less than ten percent of the radiation exposure received from natural background radioactivity.

SCORPION carried two torpedoes with nuclear weapons containing plutonium. While the monitoring campaign was for the express purpose of assessing the impacts from the nuclear reactor, sediment, water, and marine life samples collected at the SCORPION site in 1986 were also analyzed for plutonium. Total plutonium radioactivity concentrations and the relative concentrations of plutonium isotopes were typical of background concentrations due to fallout from nuclear weapons testing. Thus, there is no evidence of leakage of plutonium from nuclear weapons that were on the submarine when it sank.

Summary information on the radiological surveys of the THRESHER and SCORPION sites was published in reference 23. In 1993, the Navy issued detailed unclassified reports of the radiological environmental monitoring of the THRESHER and SCORPION sites, references 24 and 25. This monitoring demonstrates that the THRESHER and SCORPION have not had a significant effect on the radioactivity in the environment.

SOLID RADIOACTIVE WASTE DISPOSAL

During maintenance and overhaul operations, solid low-level radioactive wastes consisting of contaminated rags, plastic bags, paper, filters, ion exchange resin and scrap materials are collected from nuclear-powered ships and their support facilities. These low-level radioactive materials are required to be strictly controlled to prevent loss. These controls include Naval accountability procedures which require serialized tagging and marking and signatures by radiologically trained personnel.

Table 1 summarizes the total radioactivity and volumes of radioactive solid waste disposed of during the last five years. Table 1 includes all waste generated by U.S. Naval nuclear-powered ships and the listed support facilities since all radioactive solid waste generated by U.S. nuclear-powered ships is transferred to the listed facilities. The quantity of solid radioactive waste in any one year from a particular facility depends on the amount and type of support work performed that year. Table 1 does not include fuel or other classified radioactive components shipped to Department of Energy facilities.

Figure 2 shows that the total annual volume of solid low-level radioactive waste was substantially reduced in the 1970's, despite increasing numbers of ships. This reduction was accomplished simultaneously with reduction in personnel radiation exposure, as described in reference 26. This reduction was accomplished by several techniques including a total containment concept for radiological work which minimizes the spread of radioactivity to non-radioactive materials, use of preplanning and mockups to minimize rework, reusing rather than disposing of tools and equipment, use of radioactive liquid processing procedures which minimize depletion of processing media, use of compaction equipment and efficient packaging to fully use space in disposal containers, and separating solid waste that requires special disposal owing to its radioactive content from that which does not. The latter is achieved by work site controls and by use of sensitive detection equipment to detect radioactivity only slightly greater in concentration than that found in natural materials such as soil, rocks, water, and biological matter (see reference 18) thus requiring the material to be handled as radioactive for waste disposal purposes. Material which passes the screening provided by this sensitive detection equipment can be disposed of as ordinary waste. Challenging goals are set by each shipyard to ensure continuing management attention to minimizing generation of waste in radiological work.

The annual volume of solid low-level radioactive waste disposed of in 1995 by the entire Naval Nuclear Propulsion Program, as shown in Table 1, could be contained in a cube measuring about seventeen yards on a side. The total annual volume is approximately fourteen percent of the total volume of solid low-level radioactive waste buried in all U.S. commercial disposal sites each year (reference 27).

Solid radioactive waste materials are packaged in strong tight containers, shielded as necessary and shipped to burial sites licensed by the U.S. Nuclear Regulatory Commission or a State under agreement with the Nuclear Regulatory Commission. Solid radioactive materials from Naval nuclear-powered ships have not been dumped at sea since 1970 when the Navy issued procedures prohibiting sea disposal of solid radioactive materials. Shipyards and other shore facilities have never been permitted to dispose of radioactive solid wastes by burial on their own sites.

The Low-Level Radioactive Waste Policy Amendments Act of 1985 establishes that the states are responsible, either individually or in multi-state compacts, for providing for the disposal of low-level radioactive waste from private and non-Department of Energy Federal Government generators. Under this law, a waste compact may prohibit disposal of waste from outside the compact. Only two waste disposal sites are operating. The Northwest Compact site in Richland, Washington accepts waste only from the Northwest and Rocky Mountain Compact, which includes Navy facilities in

TABLE 1 DISPOSED RADIOACTIVE SOLID WASTE FROM U.S. NAVAL NUCLEAR-POWERED SHIPS AND THEIR SUPPORT FACILITIES FOR 1991 THROUGH 1995

FACILITY	1991 THOUSAND CUBIC FEET	1991 CURIES	1992 THOUSAND CUBIC FEET	1992 CURIES	1993 THOUSAND CUBIC FEET	1993 CURIES	1994 THOUSAND CUBIC FEET	1994 CURIES	1995 THOUSAND CUBIC FEET	1995 CURIES
Kittery, Maine Portsmouth Naval Shipyard	4	9	2	2	0	0	3	17	1	<1
Groton, New London, Conn. Electric Boat Division, State Pier and Sub Base	2	<1	1	<1	1	1	2	2	1	<1
Newport News, Virginia Newport News Shipbuilding	15	3	19	5	9	<1	3	7	3	14
Norfolk, Virginia Naval Shipyard and Tenders	17	1	36	15	32	40	22	165	19	6
Charleston, South Carolina Naval Shipyard and Tenders, and Naval Nuclear Power Training Unit	13	122	8	14	9	246	22	48	72	6
Vallejo, California Mare Island Naval Shipyard	5	1	8	31	10	4	29	6	10	13
Bremerton, Washington Puget Sound Naval Shipyard	27	86	23	59	16	18	11	35	16	24
Pearl Harbor, Hawaii Naval Shipyard and Sub Base	3	6	3	1	2	3	2	50	2	85
TOTAL	86	229	100	228	79	313	94	330	124	150

NOTES:

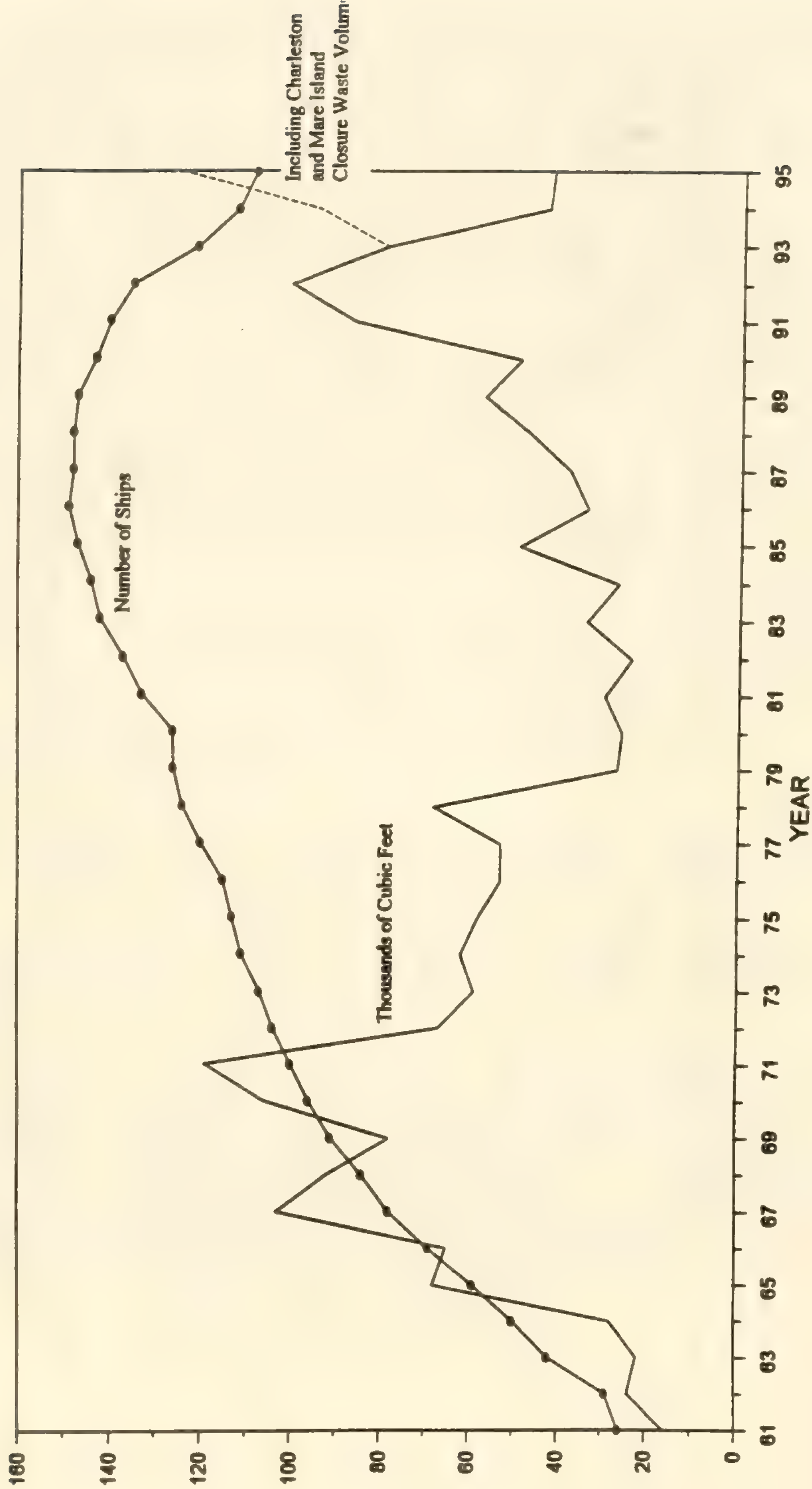
(1) This table includes all radioactive waste from tenders and nuclear-powered ships. This radioactivity is primarily cobalt 60. This radioactive waste is shipped to burial facilities licensed by the U.S. Nuclear Regulatory Commission or a State.

(2) Volumes less than 500 cubic feet are reported as 1 thousand cubic feet and activities less than 0.5 curie are reported as <1 curie.

(3) The Naval Nuclear Power Training Unit is the site of the moored training ships.

Figure 2:

Radioactive Solid Waste Disposal Volumes in the Naval Nuclear Propulsion Program 1961-1995



Washington and Hawaii. Up until June 30, 1995, the disposal site in Barnwell, South Carolina accepted waste only from Southeast Compact generators. The Southeast Compact included Navy facilities in Virginia, South Carolina and Georgia. On July 1, 1995, South Carolina enacted legislation which withdrew the state from the Southeast Compact and allowed the Barnwell site to accept waste from every state except North Carolina.

In view of the increased disposal fees and uncertain future of low-level radioactive waste disposal sites, a concerted effort has been underway to reevaluate radioactive equipment which was in storage for potential future use and to dispose of that equipment for which no specific future need was identified. For example, some of this equipment was no longer needed due to the declining fleet size. This concerted effort resulted in a peak in disposal volume in 1992. Further, the closure of Mare Island and Charleston Naval Shipyards has resulted in the disposal of much of the equipment from these facilities. The volume of low-level radioactive waste shipped from these two shipyards accounts for 66 percent of the total volume shipped during 1995. The dashed line in Figure 2 represents the total amount of low-level radioactive solid waste shipped for disposal including Mare Island and Charleston Naval Shipyard closure waste.

Deactivation of Ingalls Shipbuilding Radiological Facilities

From 1958 to 1980, Ingalls Shipbuilding was engaged in the construction and overhaul of Naval nuclear-powered ships in Pascagoula, Mississippi. The shipyard radiological facilities which supported this work were deactivated between 1980 and 1982 by removing and disposing of all radioactive material associated with Naval nuclear propulsion plants. Useful items, such as tools and equipment that were radioactively contaminated, were transferred to other organizations in the Naval Nuclear Propulsion Program. The remaining radioactive material was disposed of as solid waste.

Extensive radiological decommissioning surveys were performed to verify the removal of this radioactive material. Direct radiological surveys were performed on over 274,000 square feet of building and facility surfaces. Over 11,000 samples of these surfaces as well as soil, ground cover and concrete were taken from all areas where radioactive work was previously performed. These samples were analyzed using sensitive laboratory equipment. In addition, both the State of Mississippi and the U.S. Environmental Protection Agency (reference 28) performed overcheck surveys of the deactivated facilities. After these surveys were completed, the Ingalls facilities were released for unrestricted use. Personnel who subsequently occupy these facilities will not receive measurable radiation exposure above natural background levels that exist in areas not affected by Naval nuclear propulsion plant work. Reference 28 is the report of the survey of the Ingalls facilities by the Environmental Protection Agency.

Closure of Charleston and Mare Island Naval Shipyards

Mare Island Naval Shipyard was engaged in construction, overhaul, and refueling of Naval nuclear-powered ships from 1956 to 1995. Charleston Naval Shipyard was engaged in overhaul and refueling of Naval nuclear-powered ships from 1959 to 1994. The 1993 round of the Base Closure and Realignment Act process approved closure of these shipyards. Similar to the process followed at Ingalls Shipbuilding, the radiological facilities at both Charleston and Mare Island have been deactivated.

As at Ingalls, extensive radiological decommissioning surveys are being performed to verify the removal of radioactive material. At each shipyard, direct radiological surveys have been performed on over 5,000,000 square feet of building and facility surfaces and over 40,000 samples of soil, ground cover, and concrete have been analyzed using sensitive laboratory equipment. This survey effort is nearly finished at both shipyards. No cobalt 60 was detected other than trace concentrations in a few localized areas. Simple, proven cleanup methods were used to remediate these areas. Both the radiological deactivation work and the survey work were performed by shipyard workers.

The Navy's radiological verification surveys will be completed by April 1996. Both the EPA and the states are reviewing the Navy's survey data, conducting overcheck surveys, and providing agreement with the Navy's results. Personnel who subsequently occupy these facilities will not receive measurable radiation exposure above natural background levels.

The successful radiological deactivation and closure work at Ingalls, Charleston, and Mare Island demonstrates that the stringent control over radioactivity exercised by the Naval Nuclear Propulsion Program from its inception has been successful in preventing radiological contamination of the environment and in avoiding expensive radiological liabilities at shipyards.

Mixed Radioactive and Hazardous Waste

Waste which is both radioactive and chemically hazardous is regulated under both the Atomic Energy Act and the Resource Conservation and Recovery Act (RCRA) as "mixed waste." Within the Naval Nuclear Propulsion Program, concerted efforts are taken to avoid commingling radioactive and chemically hazardous substances so as to minimize the potential for generation of mixed waste. For example, these efforts include avoiding the use of acetone solvents, lead-based paints, lead shielding in disposal containers, and chemical paint removers. As a result of Program efforts to avoid the use of chemically hazardous substances in radiological work, Program activities typically generate less than thirty-five cubic meters of mixed waste each year requiring off-site treatment following completion of on-site processing. This small amount of mixed waste, along with about one hundred cubic meters of mixed waste from previous Program work, is stored pending the development of Department of Energy and commercial mixed waste treatment capacity required to deal with over 600,000 cubic meters of non-Program Department of Energy mixed waste. Pursuant to the requirements of the 1992 Federal Facility Compliance Act, mixed waste site treatment plans were prepared to address treatment of all Program mixed waste streams. Following public comment, the plans were approved by applicable Federal and State regulators for each state.

Disposal of Decommissioned, Defueled Naval Submarine Reactor Plants

During the 1980's, the nuclear powered submarines constructed in the 1950's and 1960's began to reach the end of their service life. In 1982, the Navy, with the Department of Energy as a cooperating agency, published a Draft Environmental Impact Statement (EIS) on the disposal of decommissioned, defueled Naval submarine reactor plants. The Draft EIS was widely distributed to individuals, environmental organizations, state and local officials, and other Federal agencies. All substantive comments were analyzed and addressed in the Final EIS which was issued in 1984 (reference 23). Although the Navy had evaluated the alternative of disposing of the defueled ships by sinking at sea, the preferred alternative identified in the Final EIS was to dispose of the defueled reactor plants at a Federal disposal facility already used for low-level radioactive waste disposal. In December 1984, the Secretary of the Navy issued a Record of Decision to proceed with land disposal.

A submarine is constructed with the nuclear power plant inside a single section of the ship called the reactor compartment. Before the reactor compartment is disposed of, the nuclear fuel is removed and handled in the same manner as nuclear fuel removed during refueling of nuclear-powered ships. The defueled reactor compartments are removed from decommissioned submarines in drydocks at the Puget Sound Naval Shipyard in Bremerton, Washington. After removal from a submarine, the reactor compartment is sealed and loaded onto a barge for transport to the Port of Benton on the Columbia River near the Department of Energy Hanford Site. At the Port of Benton, the reactor compartment is transferred to a land transporter which carries the reactor compartment to the disposal trench on the Hanford Site. Further information on this process is contained in the Final EIS (reference 23). The first defueled reactor compartment was shipped to Hanford in 1986. Eleven defueled reactor compartments were shipped in 1995, which brought the total number shipped to fifty-four.

TRANSPORTATION OF RADIOACTIVE MATERIAL

Shipments of radioactive materials in the Naval Nuclear Propulsion Program are required to be made in accordance with applicable regulations of the U.S. Department of Transportation, U.S. Department of Energy, and U.S. Nuclear Regulatory Commission. The purpose of these regulations is to ensure that shipments of radioactive material are adequately controlled to protect the environment and the health and safety of the general public. These regulations are applicable to all radioactive material shipments.

The above regulations provide requirements for the container design, certification, and identification as applicable for the specific quantity, type and form of radioactivity being shipped. Naval shipping container design requirements invoke shielding and integrity specifications and meet all regulatory requirements. They provide for testing of container designs, training and qualification of workers who construct containers, and quality control inspections during fabrication to ensure the containers will meet their design requirements.

In addition to imposing requirements of Federal transportation regulations, the Navy has issued standard instructions to further control shipments of radioactivity associated with U.S. Naval nuclear propulsion plants. These standard instructions result in a quality assurance program which includes inspections and assessments by independent organizations and senior management. Organizations making shipments are required to prepare local procedures which require use of compliance checklists and management review to ensure compliance with applicable Department of Transportation, Navy and disposal sites requirements. Only specially trained, designated people, knowledgeable in shipping regulations, are permitted to authorize shipments of radioactive material.

Protective transportation services such as signature security service or sealed shipping vehicles are required for these shipments to ensure point-to-point control and traceability of each shipment from shipper to receiver. A readily accessible log of all shipments in transit is maintained to enable prompt identification and provide the basis for advice on the nature of the shipment. Return receipts are required to be made in writing by receivers to ensure that radioactive material has not been lost in shipment. Receipt inspection of containers of radioactive material and accompanying documents are required promptly after receipt to monitor compliance. Even minor discrepancies from detailed shipping regulations are required to be reported to the shipper so that correction can be made in future shipments. This is done to ensure compliance with shipping regulations.

Radioactive materials shipped in the Naval Nuclear Propulsion Program include anticontamination clothing for laundry, small sealed sources used for calibrating radiation monitoring instruments, tools and equipment used for radioactive work, low-level radioactive waste, radioactive components and new and spent naval fuel. A total of approximately 1,000 shipments are made annually by Naval nuclear-powered ships and their support facilities, which is a small part of the more than two million shipments of radioactive materials made annually in the United States (reference 29).

Nearly all radioactive shipments in the Naval Nuclear Propulsion Program contain only low-level radioactivity classified under Department of Transportation regulations as low specific activity or limited quantity shipments. The predominant radionuclide associated with these shipments is cobalt 60 in the form of insoluble metallic oxide corrosion products attached to surfaces of materials inside shipping containers. Most low-level shipments are made by truck. Air transport is used occasionally in the Naval Nuclear Propulsion Program. These air shipments involve only very low-level radioactivity and are not shipped on passenger planes.

Approximately one quarter of the low-level radioactivity shipments are minute quantities in sealed instrument calibration check sources. These sources contain insignificant quantities of radioactivity which are comparable to the radioactivity in typical ionization type smoke detectors. Greater than one-half of these low-level shipments are anticontamination clothing, equipment and tools. The anticontamination laundry involves shipments of special outer clothing potentially contaminated with low levels of radioactivity while worn in controlled work areas. This laundry is shipped by Nuclear Regulatory Commission or agreement state licensed contractors to their facilities for cleaning. On the average, one shipment of low-level radioactive waste per month is made from each facility listed in Table 1.

The remaining few shipments are new and spent naval fuel and radioactive components associated with reactors and these are shipped by the Department of Energy. Such shipments are made infrequently since Naval nuclear-powered ships currently require at most one refueling during their service lives. Measures are carried out to assist in safeguarding these shipments and assuring they reach their destination. Each naval spent fuel shipment is escorted by U.S. Government representatives and each shipping container is specifically designed to withstand extreme accident impacts, fire, or water immersion, and to prevent release of the material to the environment in the event of an accident. The cargo in the nuclear fuel and radioactive component shipments is non-explosive and non-flammable and, in addition, the radioactive material in the radioactive components is in an insoluble form that should not be dispersed even in the event of an accident.

Naval spent fuel shipments have historically been made to the Department of Energy's Idaho National Engineering Laboratory (INEL) for reprocessing. In 1992, the Department of Energy decided to stop reprocessing spent fuel at INEL. Under the National Environmental Policy Act, the Department of Energy prepared an Environmental Impact Statement (EIS) covering the management of spent fuel for which it is responsible, including fuel removed from naval reactors. The Navy participated as a cooperating agency in this effort. The final EIS was published April 1995, and a Record of Decision (ROD) was published on May 30, 1995. The ROD identifies the Department of Energy decision to regionalize spent nuclear fuel management by fuel type, which includes continued shipment of all naval spent fuel to INEL. Under the ROD and a court-ordered agreement among the Navy, the Department of Energy, and the State of Idaho, naval spent fuel will continue to be shipped to INEL through 2035 for examination and temporary storage, and it will be shipped to a permanent geologic repository for burial or centralized interim storage site outside Idaho for storage as soon as either facility is available.

For purposes of this report, estimates of annual radiation exposure to transportation crews and the general public from shipments of radioactive materials in the Naval Nuclear Propulsion Program have been made in a manner consistent with that employed by the Nuclear Regulatory Commission in reference 29. Based on comparisons of the types and numbers of radioactive shipments made, the total annual radiation exposure to all transportation crews for all shipments is estimated to be less than three man-rem. If one person were to receive all this exposure, that person would not exceed the annual radiation exposure permitted for an individual worker by the Nuclear Regulatory Commission. The total estimated radiation exposure accumulated by the public along transportation routes is not more than a few times higher than the exposure to transportation workers. The maximum exposure to any individual member of the public would be far less than that received from natural radiation. More detailed exposure estimates for naval spent fuel shipments are described in the EIS cited above and demonstrate that for the 631 container shipments made through the end of 1995, the total population dose is about two man-rem.

Shipments of radioactive materials associated with Naval nuclear propulsion plants have not resulted in any measurable release of radioactivity to the environment. There have never been any significant accidents involving release of radioactive material during shipment since the Naval Nuclear Propulsion Program began. In general, the few accidents that have occurred involved incidents such as broken truck axles or slight external damage to a shipping container with no release of radioactivity. In one incident a train collision resulted in minor denting of a new fuel shipping container with no loss of integrity of the container, no damage to the fuel and no release of radioactivity. In the only two instances that involved loss of contents, one quart containers holding samples with small amounts of radioactivity were broken in shipment. In one case this occurred when a cargo aircraft crashed. The other container was lost from a commercial ship. Both containers were recovered and there was no measurable radioactivity released since the original contents were less than one millionth of a curie.

The requirements of the Naval Nuclear Propulsion Program specify that the carriers for all radioactive material shipments shall have accident plans which identify the actions to be taken in the event the transportation vehicle is involved in an accident. These plans provide for notification of civil authorities and the originating facility. Also provided is a twenty-four hour telephone number at the originating facility for emergency guidance and assistance. The U.S. Navy would communicate with and cooperate fully with state radiological officials in the event of occurrences involving shipments of radioactive materials.

ENVIRONMENTAL MONITORING

To provide additional assurance that procedures used by the U.S. Navy to control radioactivity are adequate to protect the environment, the Navy conducts environmental monitoring in harbors frequented by its nuclear-powered ships. Environmental monitoring surveys for radioactivity are periodically performed in harbors where U.S. Naval nuclear-powered ships are built or overhauled and where these ships have home ports or operating bases. Samples from each harbor monitored are also checked at least annually by a U.S. Department of Energy laboratory to ensure analytical procedures are correct and standardized. The Department of Energy laboratory results have been consistent with shipyard results.

Navy Environmental Monitoring Program

The current Navy environmental monitoring program consists of analyzing samples of harbor sediment, water and marine life, supplemented by shoreline surveys, posted dosimeters and effluent monitoring. Sampling harbor sediment and water each quarter year is emphasized since these materials would be the most likely affected by releases of radioactivity.

As discussed earlier, cobalt 60 is the predominant radionuclide of environmental interest resulting from Naval nuclear reactor operations. Therefore, Navy monitoring procedures require collecting in each harbor approximately twenty to one hundred twenty sediment samples once each quarter year for analysis to detect cobalt 60 and other gamma emitting radionuclides. Locations and numbers of sediment samples for a particular harbor depend on the size of the harbor and the number and separation of locations where nuclear-powered ships berth. Sampling points are selected to form a pattern around ship berthing locations and to provide points in areas away from these berthing locations. The sampling locations are selected individually for each harbor considering characteristics of the harbor.

Sediment samples are collected using a dredge which samples a surface area of thirty-six square inches and has been modified to collect only the top one-half to one inch of sediment. The top layer was selected because it should be more mobile and more accessible to marine life than deeper layers. The samples are drained of excess water and placed directly into a Marinelli container for analysis. Each sediment sample is analyzed for gamma radioactivity in the container in which it is collected using a solid state germanium detector with a multichannel analyzer. The gamma data is analyzed specifically for the presence of cobalt 60. Results of the sediment samples from harbors monitored by the Navy in the U.S. and possessions are summarized in Table 2.

Table 2 shows that most harbors do not have detectable levels of cobalt 60. As reported in the past, low levels of cobalt 60, less than three millionths of a microcurie per gram, are detected around a few operating base and shipyard piers where nuclear-powered ship maintenance and overhauls were conducted in the early 1960's. These low levels are well below the naturally occurring radioactivity levels in the harbors. The radioactivity detected is from operations in the 1960's. As discussed previously, from 1971 through 1995 the total long-lived gamma radioactivity released each year within 12 miles from shore from all U.S. Naval nuclear-powered ships and their support facilities has been less than 0.002 curie. This low release amount is too small to be detectable in the harbors. A measure of the significance of these low levels is that if all of a person's food (reference 30) were to contain three millionths of a microcurie of cobalt 60 per gram, that person would receive less than ten percent of the dose from natural background radiation (see reference 18). Cobalt 60 is not detectable in general harbor bottom areas away from these piers.

Low levels of cesium 137 were detected in some sediment samples. The cesium 137 detected is not related to Naval nuclear reactor operations because the high integrity Naval fuel retains fission products. The cesium 137 concentrations measured in the sediment are due to world wide dispersion from weapons testing.

For comparison, references 31 and 32 contain evaluations by laboratories of the Environmental Protection Agency and of the Department of Energy of the effects on the environment from the accumulation of radionuclides near points of discharge from several nuclear facilities. The referenced reports conclude that radioactivity levels much greater than shown in Table 2 for Naval Nuclear Propulsion Program facilities have caused no significant radiation exposure to the general public.

TABLE 2 SUMMARY OF 1995 SURVEYS FOR COBALT 60 IN BOTTOM SEDIMENT OF U.S. HARBORS WHERE U.S. NAVAL NUCLEAR-POWERED SHIPS HAVE BEEN REGULARLY BASED, OVERHAULED OR BUILT

	Range of Cobalt 60 Analytical Results	Number of Samples With Cobalt 60		Total Bottom Area With Cobalt 60 Over $3x10^{-6}$uCi/gm
		Less Than	Greater Than	
FACILITY	(10^{-6}uCi/gm)	$3x10^{-6}$uCi/gm	$3x10^{-6}$uCi/gm	(Square Kilometers)
Kittery, Maine Portsmouth Naval Shipyard	<0.02 - <0.14	120	0	0
Groton, New London, Conn. Electric Boat Division and Sub Base	<0.02 - 1.20	400	0	0
Newport News, Virginia Newport News Shipbuilding	<0.02 - <0.12	188	0	0
Norfolk, Virginia Naval Shipyard and Base	<0.01 - <0.12	280	0	0
Charleston, South Carolina Naval Shipyard, Naval Nuclear Power Training Unit, and Bases	<0.02 - <0.14	232	0	0
Kings Bay, Georgia	<0.01 - <0.12	100	0	0
San Diego, California Navy Piers	<0.01 - <0.13	252	0	0
Vallejo, California Mare Island Naval Shipyard	<0.02 - <0.24	200	0	0
Bremerton, Washington Naval Shipyard and Base	<0.01 - <0.11	348	0	0
Pearl Harbor, Hawaii Naval Shipyard and Sub Base	<0.02 - 0.15	204	0	0
Apra Harbor, Guam	<0.01 - <0.07	128	0	0
Port Canaveral, Florida	<0.01 - <0.10	80	0	0

NOTES:

(1) The "<" symbol indicates no cobalt 60 was detected in the sample. The number given is the minimum detectable activity (MDA) i.e., the concentration at which cobalt 60 could be detected if it were present. The MDA varies from sample to sample and location to location due to statistical fluctuations.

(2) uCi/gm = microcurie per gram. 1 uCi = $1x10^{-6}$curie (Ci).

(3) One square kilometer is approximately 0.4 square mile. Estimated total cobalt 60 in the top layer of sediment is 0.01 Ci. Samples from more than one foot deep from several harbors show that total cobalt 60 present may be two to five times that measured in the surface layer.

The maximum total radioactivity observed in a U.S. harbor is less than 0.05 curie of cobalt 60. This radioactivity is small compared to background. Based on the typical concentrations of naturally occurring radioactivity such as potassium 40, radium, uranium and thorium which are described in reference 16 for marine sediment, the natural radioactivity in the sediment of a typical harbor amounts to hundreds of curies.

In addition to Navy analysis of environmental samples, at least ten sediment samples from each harbor monitored have been sent each year to a Department of Energy laboratory, as a check of Navy results. This Department of Energy laboratory provides a further check on the quality of environmental sample analyses by participating in the quality control programs sponsored by the Department of Energy and the Environmental Protection Agency.

The check samples were analyzed for gamma radionuclides in a manner similar to Navy procedures but with greater sensitivity. Figure 3 depicts the gamma spectra for two such samples. Both spectra show the presence of abundant naturally occurring radionuclides which contribute to measured radioactivity even if cobalt 60 were not present. The upper spectrum is for a sample to which cobalt 60 has been added to achieve a concentration of approximately three millionths of a microcurie per gram and shows easily recognizable energy peaks due to the presence of this small concentration of cobalt 60. The lower spectrum is typical of most of the sediment samples with no detectable cobalt 60.

At least five water samples are taken in each harbor once each quarter year in areas where nuclear-powered ships berth and from upstream and downstream locations. These samples are analyzed for gamma radioactivity, including cobalt 60. A solid state germanium detector with a multichannel analyzer is used to measure gamma radioactivity and detect the presence of cobalt 60. Procedures for analysis will detect cobalt 60 if its concentration exceeds the Environmental Protection Agency drinking water limits of reference 14. No cobalt 60 has been detected in any of the water samples from all harbors monitored.

An Environmental Protection Agency evaluation in reference 33 shows that the cobalt 60 from Naval nuclear propulsion plants is in the form of metallic corrosion product particles which do not appear to be concentrated in the food chain. However, samples of marine life such as mollusks, crustaceans and marine plants have been collected from all harbors monitored. Marine life samples are also analyzed using a germanium detector with a multi-channel analyzer. The results of the marine life samples from harbors monitored by the Navy in the U.S. and possessions are summarized in Table 3. Table 3 demonstrates that no buildup of cobalt 60 associated with U.S. Naval nuclear-powered ships has been detected in these samples of marine life.

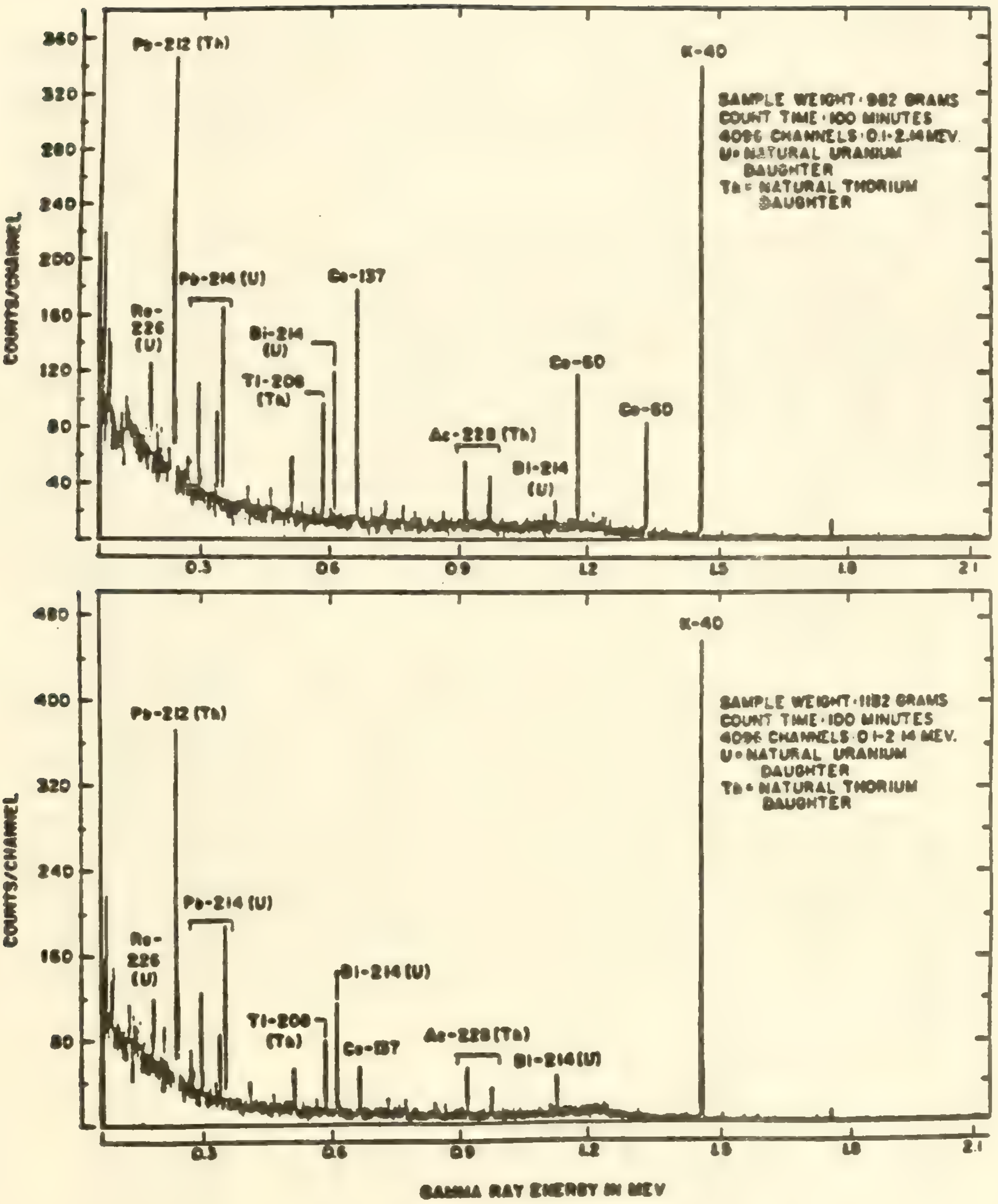


FIGURE 3
GAMMA SPECTRA OF HARBOR BOTTOM SEDIMENT
SAMPLES WITH A GERMANIUM DETECTOR

TABLE 3 SUMMARY OF 1995 SURVEYS FOR COBALT 60 IN MARINE LIFE OF U.S. HARBORS WHERE U.S. NAVAL NUCLEAR-POWERED SHIPS HAVE BEEN REGULARLY BASED, OVERHAULED OR BUILT

FACILITY	Mollusks Cobalt 60 Analytical Results (10^{-6}uCi/gm)	Crustaceans Cobalt 60 Analytical Results (10^{-6}uCi/gm)	Marine Plants Cobalt 60 Analytical Results (10^{-6}uCi/gm)
Kittery, Maine Portsmouth Naval Shipyard	<0.05	<0.10	<0.16
Groton, New London, Conn. Electric Boat Division, State Pier and Sub Base	<0.05	<0.06	<0.09
Newport News, Virginia Newport News Shipbuilding	<0.03	<0.10	<0.08
Norfolk, Virginia Naval Shipyard and Base	<0.04	<0.04	<0.04
Charleston, South Carolina Naval Shipyard, Naval Nuclear Power Training Unit, and Bases	<0.04	<0.05	N/A
Kings Bay, Georgia	<0.02	<0.01	<0.02
San Diego, California Navy Piers	<0.01	<0.01	<0.01
Vallejo, California Mare Island Naval Shipyard	<0.07	<0.10	<0.08
Bremerton, Washington Naval Shipyard and Base	<0.03	<0.07	<0.05
Pearl Harbor, Hawaii Naval Shipyard and Sub Base	N/A	<0.03	<0.05
Apra Harbor, Guam	<0.01	<0.01	<0.01
Port Canaveral, Florida	<0.02	<0.01	<0.01

NOTES:

(1) The "<" symbol indicates no cobalt 60 was detected in the sample. The number given is the minimum detectable activity (MDA) i.e., the concentration at which cobalt 60 could be detected if it were present. The MDA varies from sample to sample and location to location due to statistical fluctuations.

(2) uCi/gm = microcurie per gram. 1 uCi = 1×10^{-6}curie (Ci).

(3) N/A = Not Available. Samples of marine life from this location were not available for collection.

In all monitored harbors, twice per year shoreline areas uncovered at low tide are surveyed for radiation levels with sensitive scintillation detectors to determine if any radioactivity from bottom sediment washed ashore. All results were the same as background radiation levels in these regions, approximately 0.01 millirem per hour. Thus, there is no evidence in these ports that these areas are being affected by nuclear-powered ship operations.

Ambient radiation levels are measured using sensitive thermoluminescent dosimeters continuously posted at locations outside the boundaries of areas where radiological work is performed. These dosimeters are also posted at locations remote from support facilities to measure background radiation levels from natural radioactivity. The results of dosimeters posted at support facilities between radiologically controlled areas and the general public and dosimeters posted at remote background locations up to several miles away are compared in Table 4. The range of dosimeter readings is also given since natural background radiation levels vary from location to location primarily due to the concentration of radionuclides in the soil (reference 18). The results of Table 4 show that Naval Nuclear Propulsion Program activities had no distinguishable effect on normal background radiation levels in occupied areas outside the site perimeter.

Naval nuclear reactors and their support facilities are designed to ensure there are no significant discharges of radioactivity in airborne exhausts. Radiological controls are exercised in support facilities to preclude exposure of working personnel to airborne radioactivity exceeding one-tenth of the limits specified in reference 6. These controls, discussed in reference 26, include containment for radioactive materials and provide a barrier to prevent significant radioactivity from becoming airborne. Further, all air exhausted from these facilities is passed through high efficiency particulate air filters and monitored during discharge. Comparison of sensitive airborne radioactivity measurements in shipyards demonstrates that air exhausted from facilities actually contained a smaller amount of particulate radioactivity than this same air contained when it was drawn from the environment into the facilities.

TABLE 4 SUMMARY OF 1995 OFF-SITE AND PERIMETER RADIATION MONITORING OF U.S. HARBORS WHERE U.S. NAVAL NUCLEAR-POWERED SHIPS HAVE BEEN REGULARLY BASED, OVERHAULED OR BUILT

FACILITY	Average Off-Site Dosimeter (mrem/qtr)	Range of Off-site Dosimeter (mrem/qtr)	Average Perimeter Dosimeter (mrem/qtr)	Range of Perimeter Dosimeter (mrem/qtr)
Kittery, Maine Portsmouth Naval Shipyard	20	16 - 23	19	15 - 23
Groton, New London, Conn. Electric Boat Division, State Pier and Sub Base	26	17 - 38	24	12 - 38
Newport News, Virginia Newport News Shipbuilding	15	10 - 19	14	10 - 19
Norfolk, Virginia Naval Shipyard and Base	25	18 - 34	18	10 - 92 (See note 2)
Charleston, South Carolina Naval Shipyard, Naval Nuclear Power Training Unit, and Bases	17	11 - 29	22	17 - 31
Kings Bay, Georgia	18	12 - 24	20	15 - 29
San Diego, California Navy Piers	23	15 - 30	20	11 - 33
Vallejo, California Mare Island Naval Shipyard	17	12 - 22	17	8 - 22
Bremerton, Washington Naval Shipyard and Base	15	13 - 17	15	12 - 19
Pearl Harbor, Hawaii Naval Shipyard and Sub Base	15	13 - 19	15	12 - 18
Apra Harbor, Guam	18	16 - 22	18	12 - 30
Port Canaveral, Florida	15	11 - 20	17	13 - 23

NOTE:

(1) mrem/qtr = millirem per quarter year. 1 mrem = 1×10^{-3} rem.

(2) During the first quarter of 1995 a low level radioactive component was stored near the Norfolk Naval Shipyard boundary without the normal amount of shielding. One perimeter dosimeter near the component registered a dose of 92 millirem for the quarter. Another perimeter dosimeter further away registered a dose of 41 millirem for the quarter. The area across the shipyard boundary from the package location is vacant for several hundred feet with the nearest occupied structure being a maintenance building about 650 feet away. The calculated dose to personnel in the building due to the low level radioactive component was less than 1 millirem for the quarter. Excluding the two dosimeters mentioned above, the range of perimeter dosimeters would be 10 to 32 millirem per quarter for Norfolk Naval Shipyard.

ENVIRONMENTAL PATHWAYS ANALYSIS

Results of monitoring of environmental samples described above have shown that environmental radioactivity levels have not been changed appreciably and therefore radiation exposure to the public from operations of nuclear powered ships and their support facilities is too low to measure. Nevertheless, an analysis has been performed to provide a quantitative estimate of the radiation exposure to which any member of the general public might be exposed as a result of radioactivity in liquid and airborne effluents.

For airborne effluents, the Environmental Protection Agency COMPLY computer program is used for this analysis, as required by EPA regulations in reference 34. Site specific input parameters include radionuclide releases, distance to members of the public, wind speed and direction, and food production. The releases of airborne effluents used in the analysis are summarized in Table 5. Cobalt 60 values include actual measurements of cobalt 60 emissions from the exhaust of Navy facilities in addition to estimates of other potential sources of cobalt 60. Values for other airborne radionuclides, including iodine 131, are estimates based upon detailed study of land based naval nuclear propulsion prototype plants. For example, the release of tritium (in the form of water vapor) is based upon the very conservative assumption that half of the radioactive water handled by a large shipyard evaporates from collection and storage tanks.

Results of the airborne effluent analysis are summarized in Table 6. Table 6 compares the estimated maximum exposure to a member of the public from Program effluents with guidelines of the Nuclear Regulatory Commission in reference 13. These numerical guidelines on calculated radiation exposures implement the concept that radioactivity in effluents from light water nuclear electric power reactors should be limited to amounts and quantities as low as reasonably achievable. Although these guidelines are not applicable to nuclear-powered ships and their support facilities they provide a context in which to judge the significance of radiation exposures from Program effluents. The estimated maximum radiation exposure to a member of the general public from releases of airborne radioactivity is also much less than the standard of 10 millirem per year established by the Environmental Protection Agency in reference 34.

TABLE 5 RADIONUCLIDE RELEASES USED FOR ENVIRONMENTAL PATHWAYS ANALYSIS

Radionuclide	Annual Airborne Release, Curie
Cobalt 60*	<0.0004
Tritium	1.0
Carbon 14	0.10
Krypton 83m	0.00075
Krypton 85m	0.0039
Krypton 85	0.000013
Krypton 87	0.0019
Krypton 88	0.0054
Xenon 131m	0.00068
Xenon 133m	0.0037
Xenon 133	0.11
Xenon 135	0.071
Argon 41	0.20
Iodine 131*	<0.00008

* Site specific values are used for these radionuclides. The tabulated values bound the site specific values used in the analysis.

For liquid effluents, the results of the environmental monitoring samples demonstrate that there is no significant radiation exposure to members of the public without the need for any detailed theoretical model calculations. For example, the samples of marine life obtained from the immediate vicinity of shipyard piers and drydocks did not have any detectable cobalt 60, even with sensitive analysis. Even if cobalt 60 were assumed to be present at concentrations just below the limits of detection shown in Table 3 and a person were to eat 40 pounds per year of mollusks and crustaceans caught directly from these areas, the person would receive much less than one millirem per year. Similarly, even though the Navy minimizes releases of radioactive liquids and there has never been any detectable cobalt 60 in harbor water, the water consumption pathway cannot result in any dose to the public since seawater is not used for drinking water consumption in the vicinity of these facilities. Thus, exposures to members of the public from the Naval Nuclear Propulsion Program liquid effluents are far less than the guidelines of the Nuclear Regulatory Commission which are listed in Table 6.

TABLE 6 ESTIMATED MAXIMUM RADIATION EXPOSURE TO AN INDIVIDUAL FOR ASSUMED LIQUID AND AIRBORNE RADIOACTIVITY RELEASES FROM SHIPYARDS ENGAGED IN NAVAL NUCLEAR PROPULSION WORK

	Maximum Exposure To An Individual	
	NRC Guideline millirem/year	Estimated Value millirem/year
From Radionuclides In Liquid Releases	3 whole body, or 10 any organ	less than 1
From Gaseous Radionuclides In Airborne Releases	5 whole body, or 15 skin	less than 0.1
From Other Radionuclides In Airborne Releases	15 any organ	less than 0.1

	Maximum Exposure To An Individual	
	EPA Regulation millirem/year	Estimated Value millirem/year
From Radioiodine In Airborne Releases	3	less than 0.03
From Other Radionuclides In Airborne Releases	10	less than 0.1

AUDITS AND REVIEWS

The requirements and procedures for control of radioactivity is an important part of the training programs for everyone involved with radioactivity in the Naval Nuclear Propulsion Program. Such training is part of the initial qualification of shipyard workers and of Naval personnel assigned to ships and bases, and is required to be repeated regularly. Emphasis on this training is part of the concept that radiological control personnel alone cannot cause radiological work to be well performed; production and operations personnel and all levels of management are required to be involved in the control of radioactivity.

Checks and balances of several kinds are also set up to help ensure control of radioactivity. First, written procedures exist which require verbatim compliance. Radiological control personnel monitor various steps in radioactive waste processing. In each shipyard an independent organization, separate from the radiological control organization, audits all aspects of radioactive waste processing. Audits are performed by representatives from Naval Reactors headquarters who are assigned full time at each shipyard. Radiological control personnel from headquarters also conduct periodic inspections of each shipyard. In addition, shipyards have made detailed assessments of the environmental effects of shipyard operations and have published reports on the results of these assessments. Similarly, there are multiple levels of audits and inspections for the other Navy shore facilities, tenders, and nuclear-powered ships and for other radiologically controlled functions such as transportation. Even the smallest audit findings are followed up to ensure proper recovery and permanent corrective actions are taken and to help minimize the potential for future deficiencies.

The policy of the Navy is to provide for close cooperation and effective communication with state radiological officials involving occurrences that might cause concern because of radiological effects outside the ships or shore facilities. The Navy has reviewed radioactive waste disposal, radiological environmental monitoring, transportation and other radiological matters with state radiological officials in the states where Navy nuclear-powered ships are based or overhauled. Although there were no occurrences in 1995 which resulted in radiological effects to the public outside these facilities, states were notified when inquiries showed public interest in the possibility that such events had occurred. The Navy has encouraged states to conduct independent radiological environmental monitoring in harbors where Naval nuclear-powered ships are based or overhauled; the results of monitoring by states have been consistent with Navy results.

An Environmental Protection Agency laboratory has conducted detailed environmental surveys of selected U.S. harbors (references 28 and 35 through 43). This laboratory has performed these surveys in the harbors at Pascagoula, Mississippi; Charleston, South Carolina; Pearl Harbor, Hawaii; San Diego, Alameda, San Francisco and Vallejo, California; New London and Groton, Connecticut; Newport News, Portsmouth and Norfolk, Virginia; Kings Bay, Georgia; Kittery, Maine-Portsmouth, New Hampshire; and Bremerton and Bangor, Washington. Environmental Protection Agency results have been consistent with Navy results. The Environmental Protection Agency reports have concluded that operation of Naval nuclear-powered ships has had no adverse impact on public safety or health.

CONCLUSIONS

1. The total long-lived gamma radioactivity in liquids released into all ports and harbors from the U.S. Naval Nuclear Propulsion Program was less than 0.002 curie in 1995.

2. No increase of radioactivity above normal background levels has been detected in harbor water where U.S. Naval nuclear-powered ships are based, overhauled, or constructed.

3. Liquid releases from U.S. Naval nuclear-powered ships and their support facilities have not caused a measurable increase in the general background radioactivity of the environment.

4. Low level cobalt 60 radioactivity in harbor bottom sediment is detectable around a few operating base and shipyard piers from low level liquid releases in the 1960's. Concentrations of cobalt 60 are less than the concentrations of naturally occurring radionuclides around these piers. Cobalt 60 is not detectable in general harbor bottom areas away from these piers. The maximum total radioactivity observed in a U.S. harbor, less than 0.05 curie of cobalt 60, is small compared to the naturally occurring radioactivity. Comparison to previous environmental data summarized in references 1 through 5 shows that these environmental cobalt 60 levels are continuing to decrease.

5. Estimates of radiation exposures to members of the public from the Naval Nuclear Propulsion Program are far less than either the U.S. Environmental Protection Agency environmental standards, the guidelines of the U.S. Nuclear Regulatory Commission or the exposure from natural background radioactivity.

6. Procedures used by the Navy to control releases of radioactivity from U.S. Naval nuclear-powered ships and their support facilities have been effective in protecting the environment and the health and safety of the general public. Independent radiological environmental monitoring performed by the U.S. Environmental Protection Agency and states have confirmed the adequacy of these procedures. These procedures have ensured that no member of the general public has received measurable radiation exposure as a result of current operations of the Naval Nuclear Propulsion Program.

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APPENDIX

ENVIRONMENTAL MONITORING SURVEY CHARTS

Environmental monitoring survey charts for harbors monitored for radioactivity associated with U.S. Naval nuclear-powered ships in the U.S. and possessions are listed below and included in this Appendix. The sampling locations for harbor water and harbor sediment are shown. In addition, shoreline survey areas and the locations of posted dosimetry devices are shown on the figures.

Figure No.	Location
	California
1	U.S. Naval Air Station, Alameda
2	Hunters Point Shipyard, San Francisco
3	Mare Island Naval Shipyard, Vallejo
4	San Diego Harbor
5	San Diego Harbor, Ballast Point Area
	Connecticut
6	Electric Boat Division, Groton
7	U.S. Naval Submarine Support Facility, New London Harbor
8	New London Area
	Florida
9	Port Canaveral
	Georgia
10	U.S. Naval Submarine Base, Kings Bay
	Guam
11	Apra Harbor
	Hawaii
12	Pearl Harbor Area
13	Pearl Harbor Naval Shipyard
14	U.S. Naval Submarine Base, Pearl Harbor
	New Hampshire/Maine
15	Portsmouth Naval Shipyard
	South Carolina
16	U.S. Naval Station and Naval Shipyard, Charleston
17	Naval Nuclear Power Training Unit, Charleston

Virginia
18 Newport News Shipbuilding, Newport News
19 Norfolk Naval Shipyard, Portsmouth
20 U.S. Naval Station Norfolk
21 Norfolk--Portsmouth Virginia Area

Washington
22 Puget Sound Naval Shipyard
23 Bangor/Hood Canal

FIGURE 1
ENVIRONMENTAL MONITORING LOCATIONS AT
U.S. NAVAL AIR STATION ALAMEDA, CA

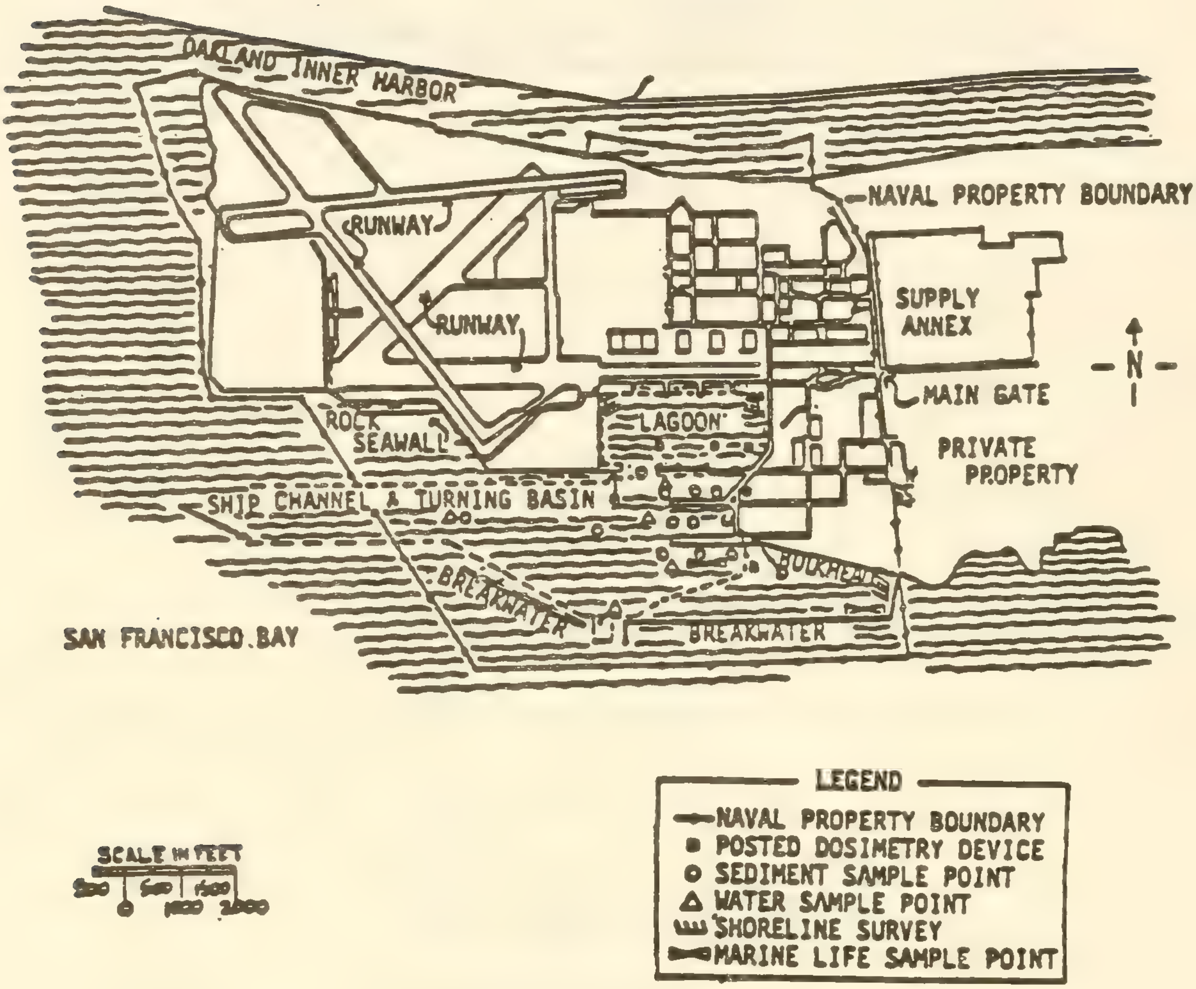


FIGURE 2
ENVIRONMENTAL MONITORING LOCATIONS AT
HUNTERS POINT SHIPYARD, SAN FRANCISCO, CA

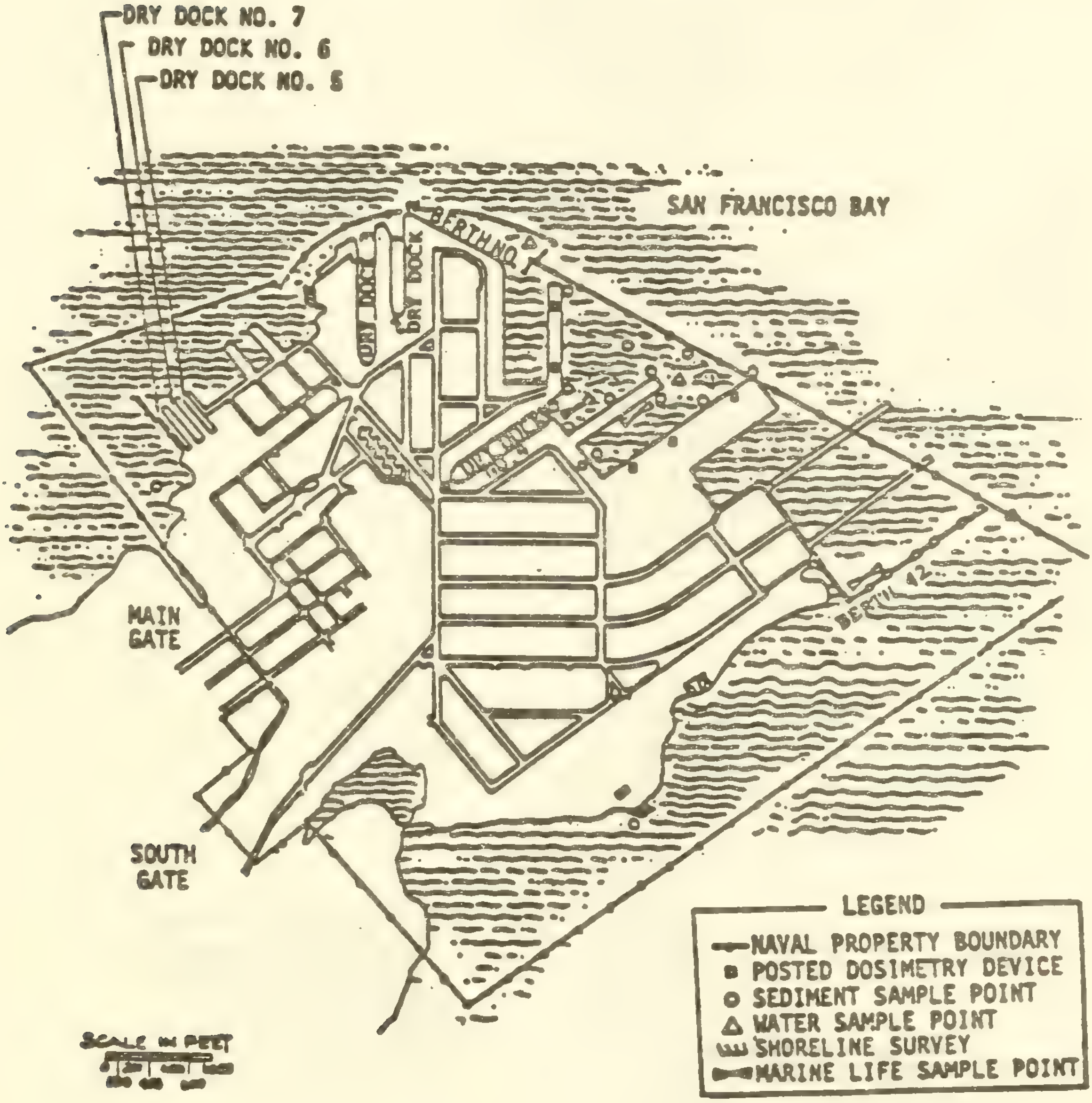


FIGURE 3
ENVIRONMENTAL MONITORING LOCATIONS AT
MARE ISLAND NAVAL SHIPYARD, VALLEJO, CA

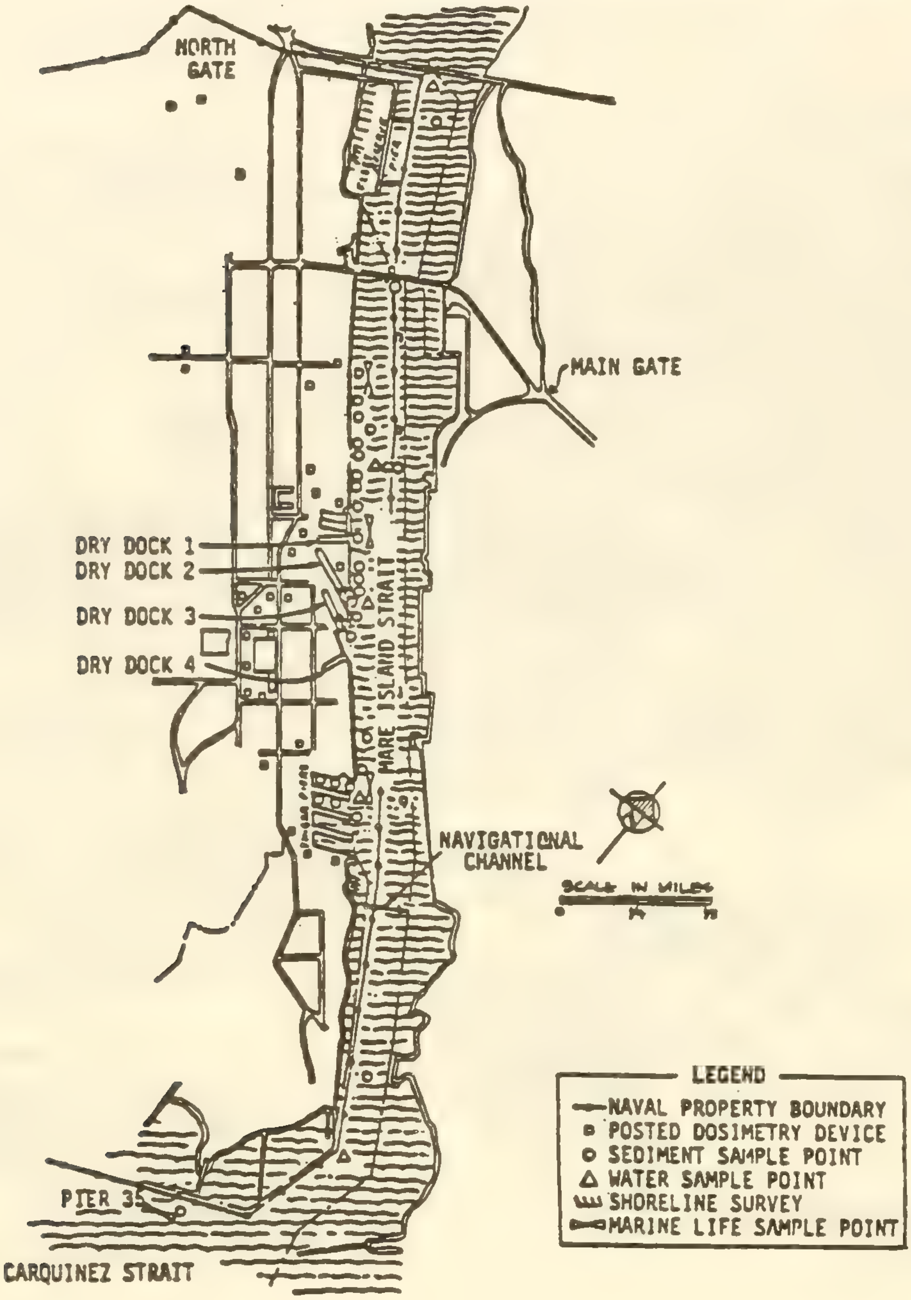
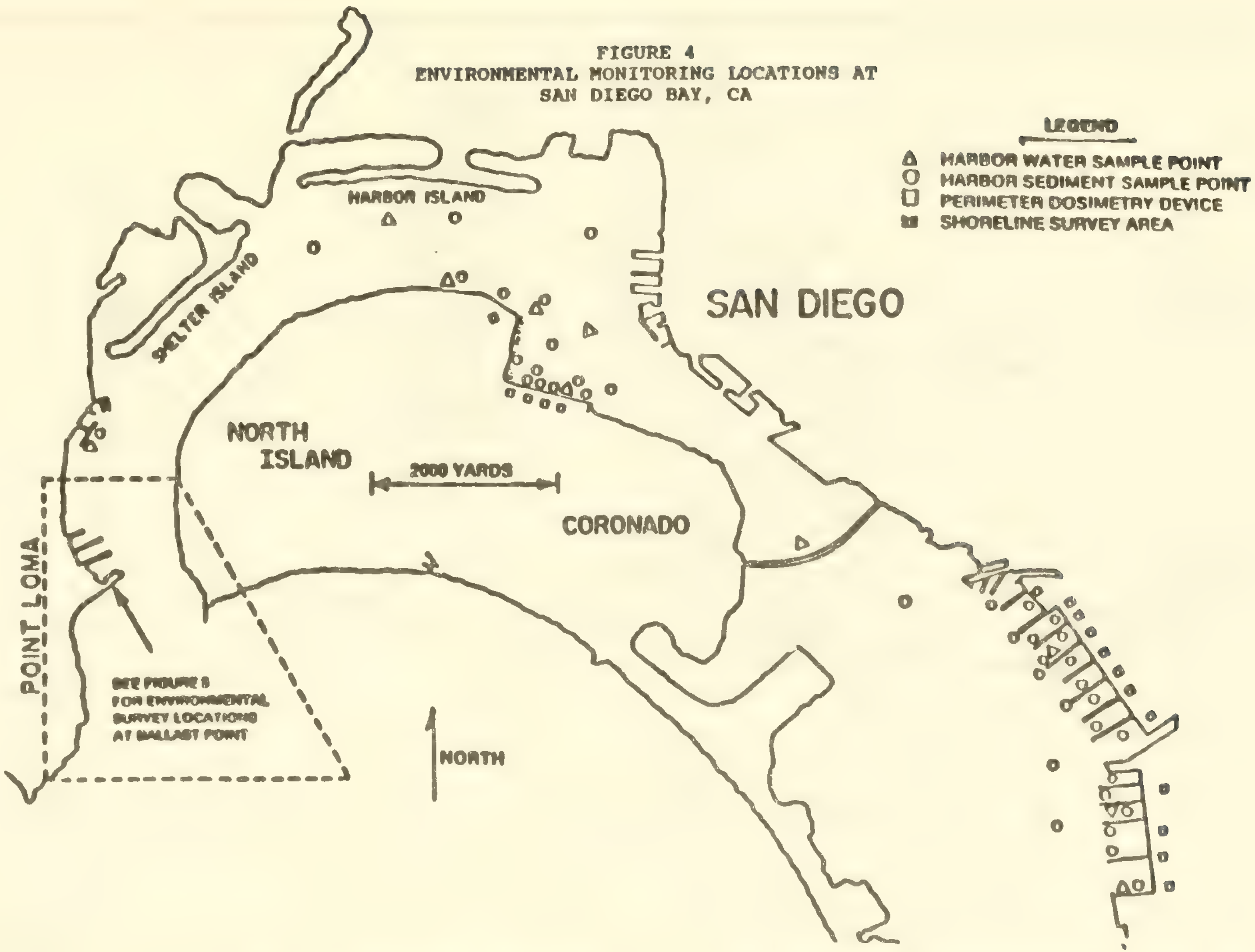


FIGURE 4
ENVIRONMENTAL MONITORING LOCATIONS AT
SAN DIEGO BAY, CA


LEGEND
△ HARBOR WATER SAMPLE POINT
○ HARBOR SEDIMENT SAMPLE POINT
□ PERIMETER DOSIMETRY DEVICE
▨ SHORELINE SURVEY AREA
SAN DIEGO
HARBOR ISLAND
SELTER ISLAND
NORTH ISLAND
CORONADO
2000 YARDS
POINT LOMA
SEE FIGURE 5 FOR ENVIRONMENTAL SURVEY LOCATIONS AT BALLAST POINT
NORTH

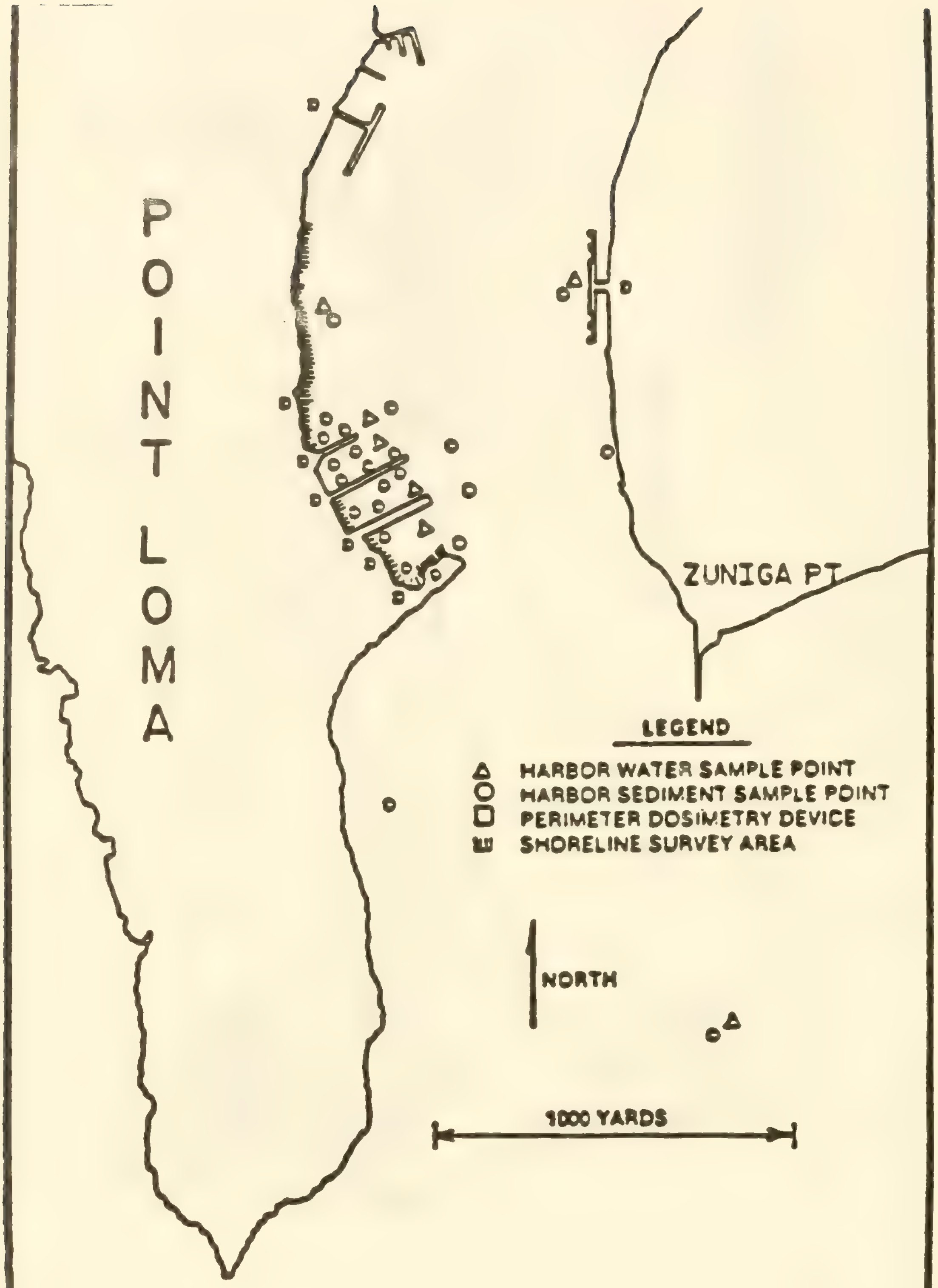
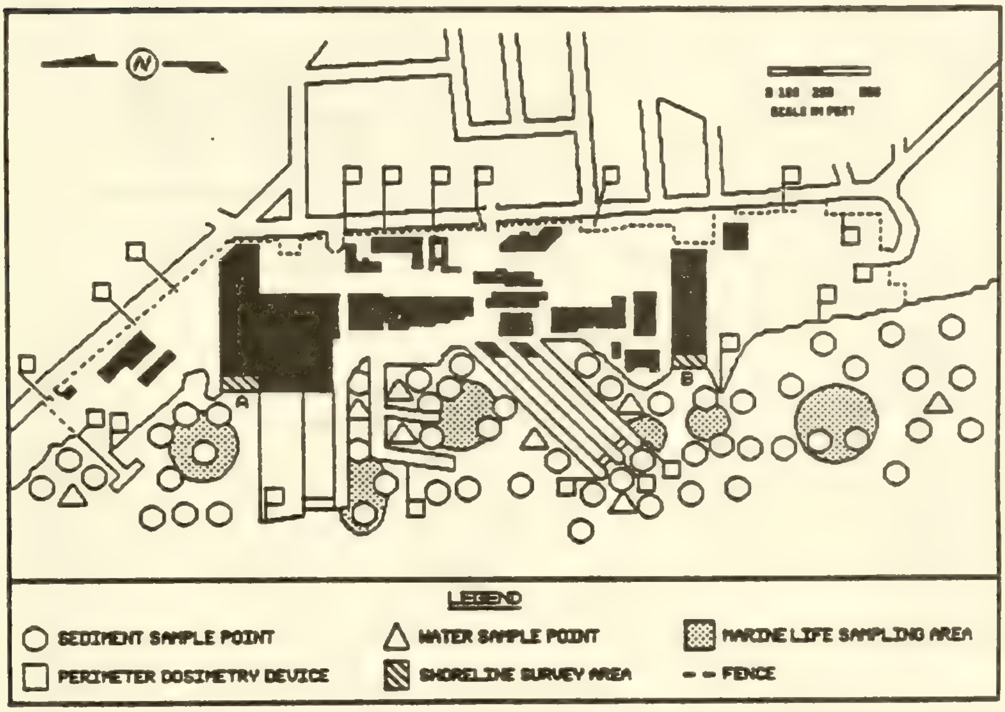

POINT LOMA
ZUNIGA PT
LEGEND
△ HARBOR WATER SAMPLE POINT
○ HARBOR SEDIMENT SAMPLE POINT
□ PERIMETER DOSIMETRY DEVICE
SHORELINE SURVEY AREA
NORTH
1000 YARDS

FIGURE 5
ENVIRONMENTAL MONITORING LOCATIONS AT
SAN DIEGO BAY - BALLAST POINT, CA

FIGURE 6
ENVIRONMENTAL MONITORING LOCATIONS AT
ELECTRIC BOAT CORPORATION SHIPYARD, GROTON CT



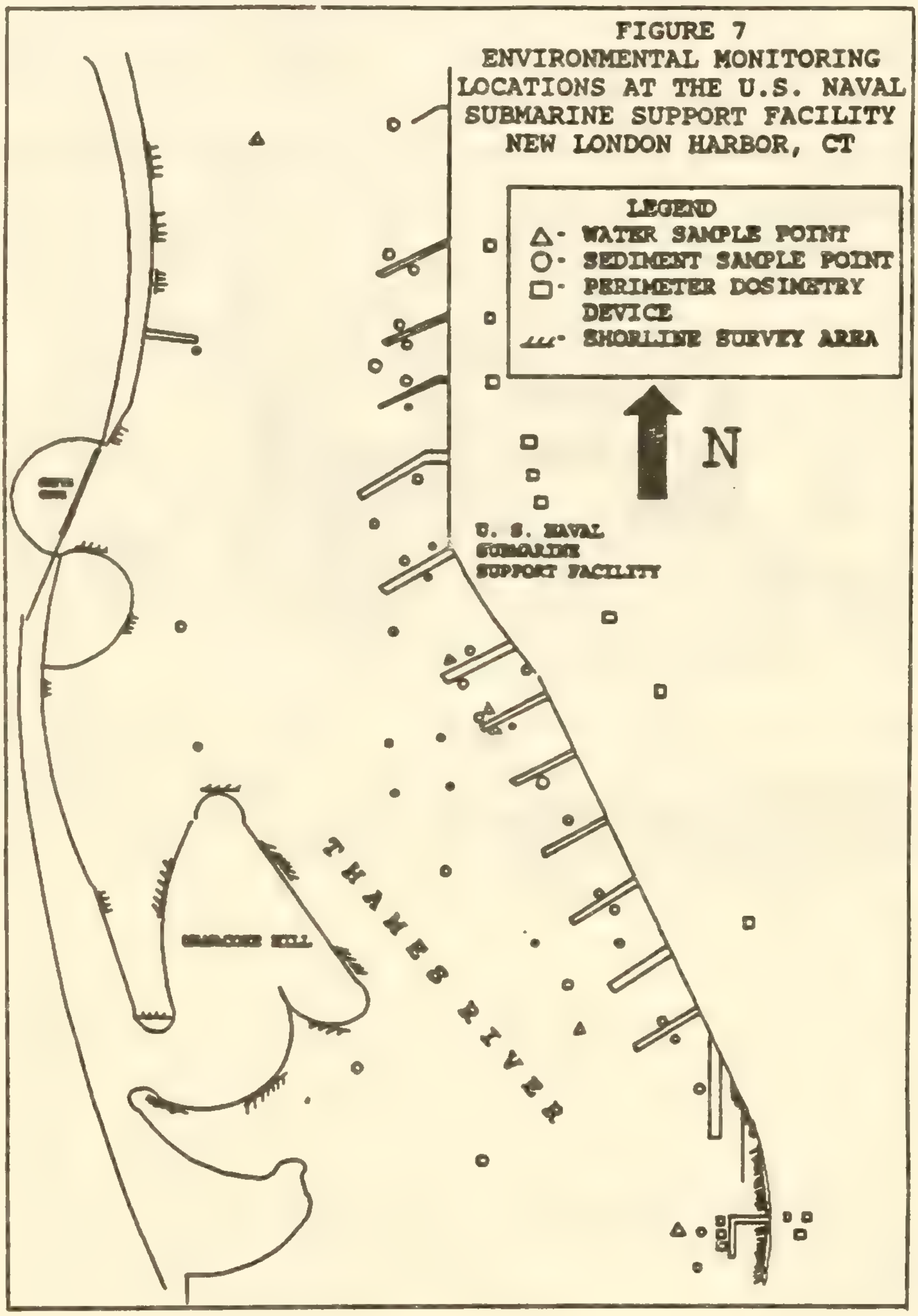
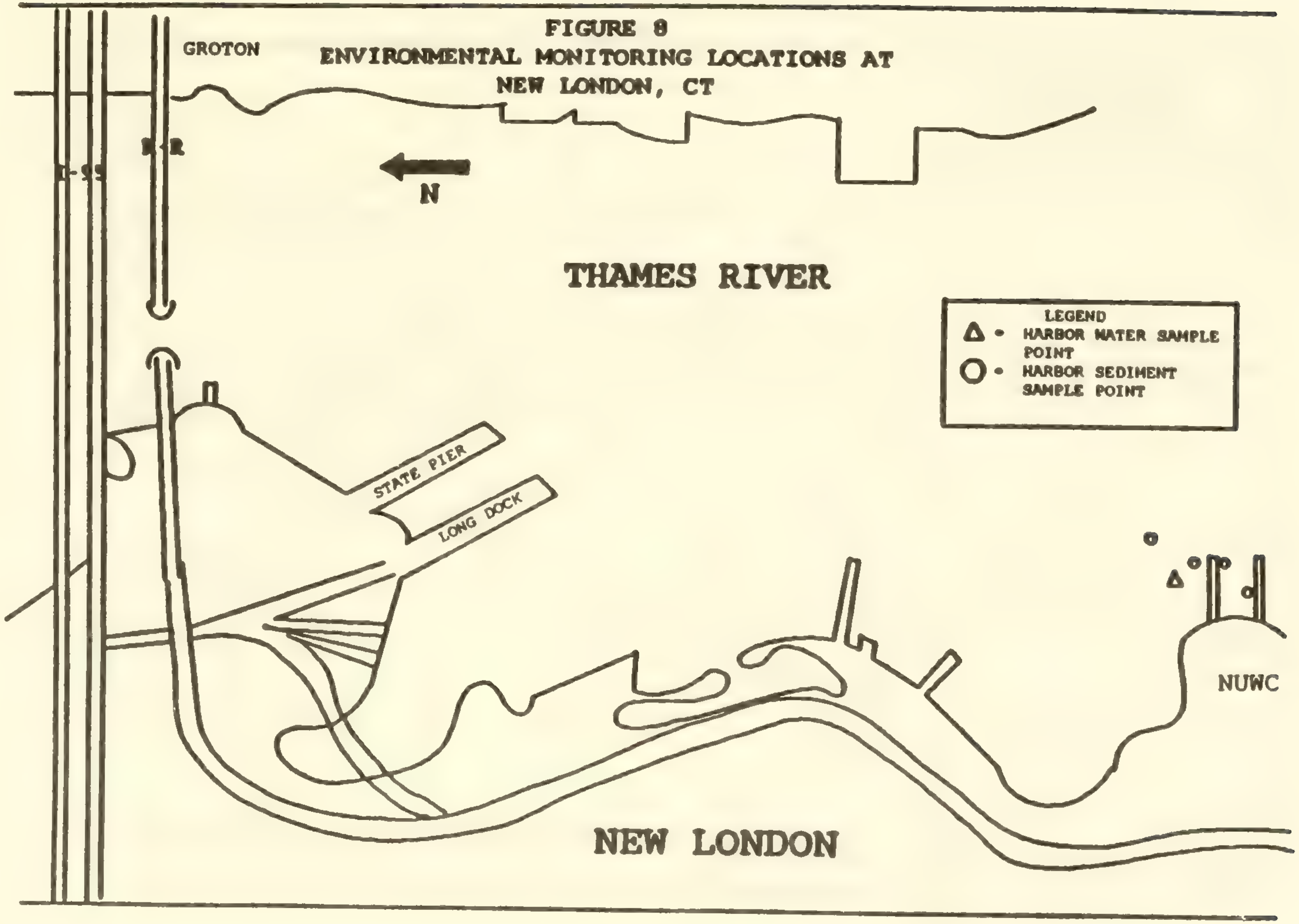


FIGURE 7
ENVIRONMENTAL MONITORING
LOCATIONS AT THE U.S. NAVAL
SUBMARINE SUPPORT FACILITY
NEW LONDON HARBOR, CT

FIGURE 8
ENVIRONMENTAL MONITORING LOCATIONS AT
NEW LONDON, CT



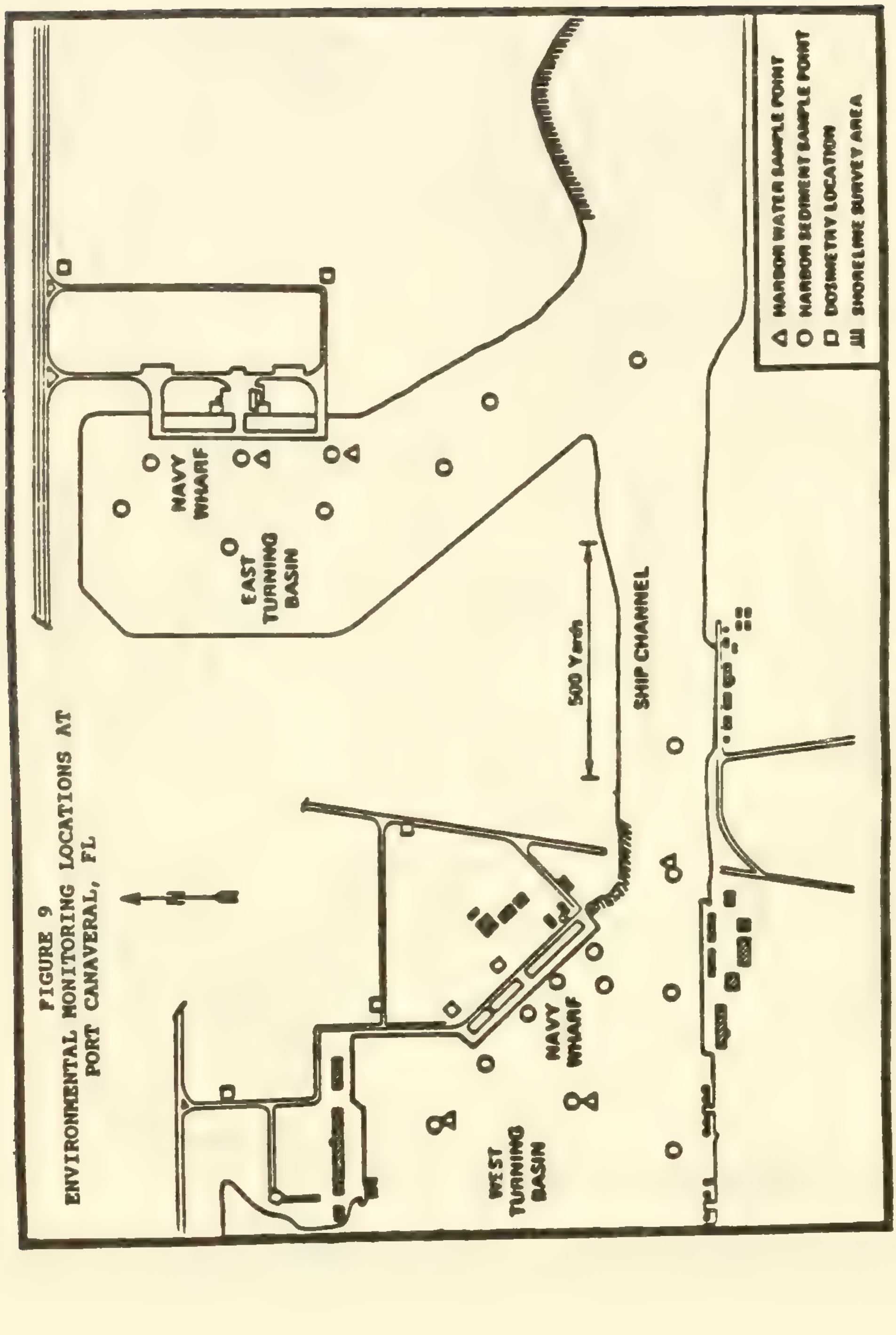


FIGURE 9
ENVIRONMENTAL MONITORING LOCATIONS AT
PORT CANAVERAL, FL

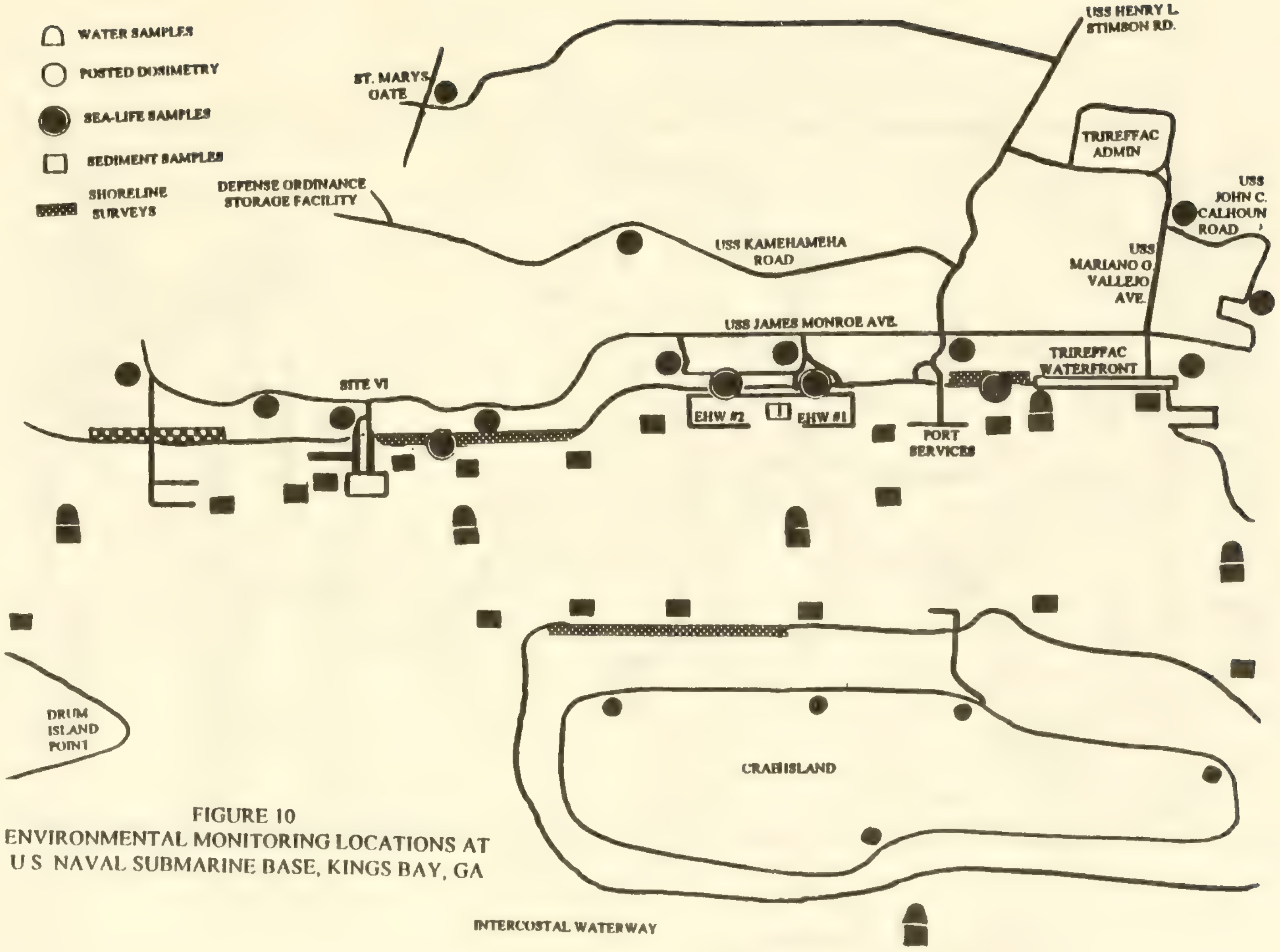


FIGURE 10
ENVIRONMENTAL MONITORING LOCATIONS AT
U S NAVAL SUBMARINE BASE, KINGS BAY, GA

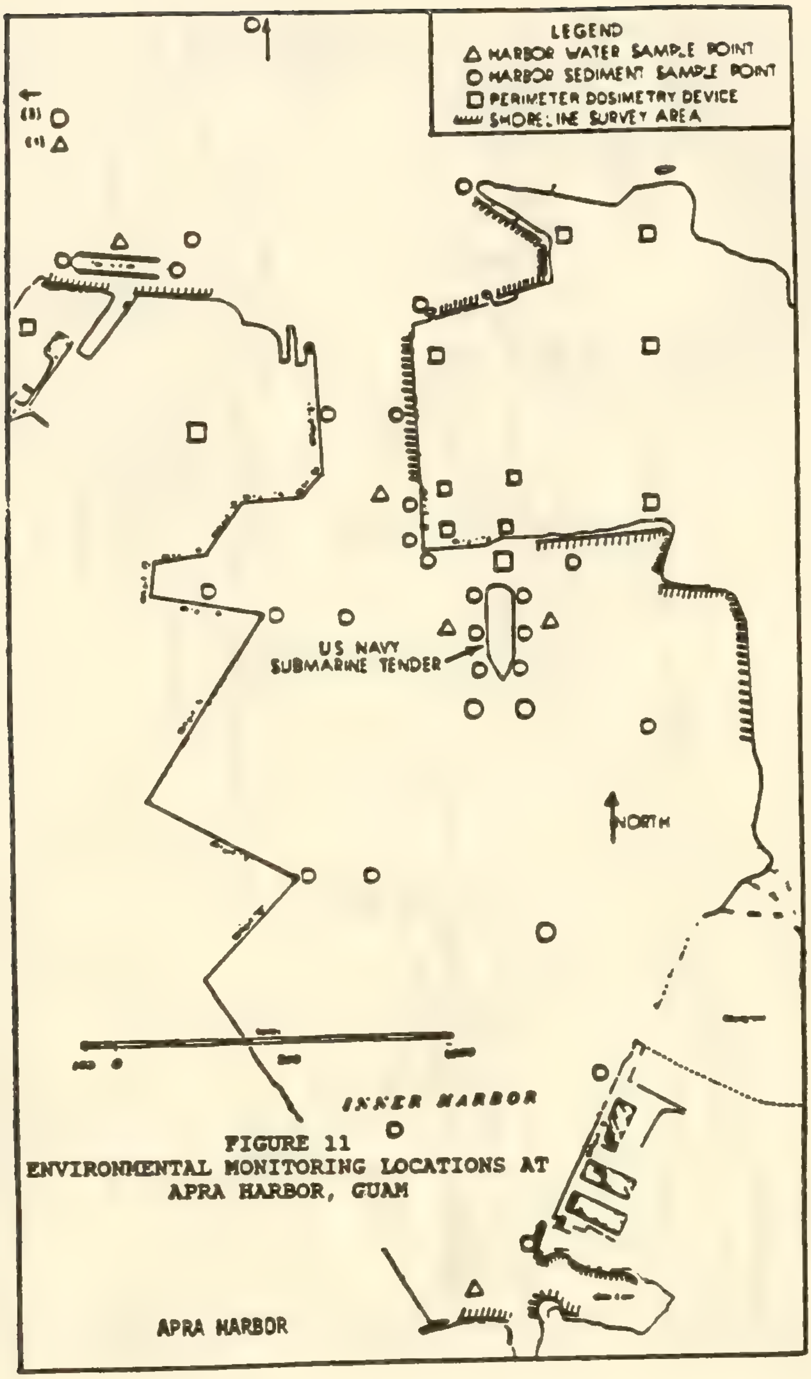

LEGEND
△ HARBOR WATER SAMPLE POINT
○ HARBOR SEDIMENT SAMPLE POINT
□ PERIMETER DOSIMETRY DEVICE
SHORELINE SURVEY AREA
US NAVY SUBMARINE TENDER
NORTH
INNER HARBOR
APRA HARBOR

FIGURE 11
ENVIRONMENTAL MONITORING LOCATIONS AT
APRA HARBOR, GUAM

FIGURE 12
ENVIRONMENTAL MONITORING LOCATIONS AT
PEARL HARBOR AREAS, HI

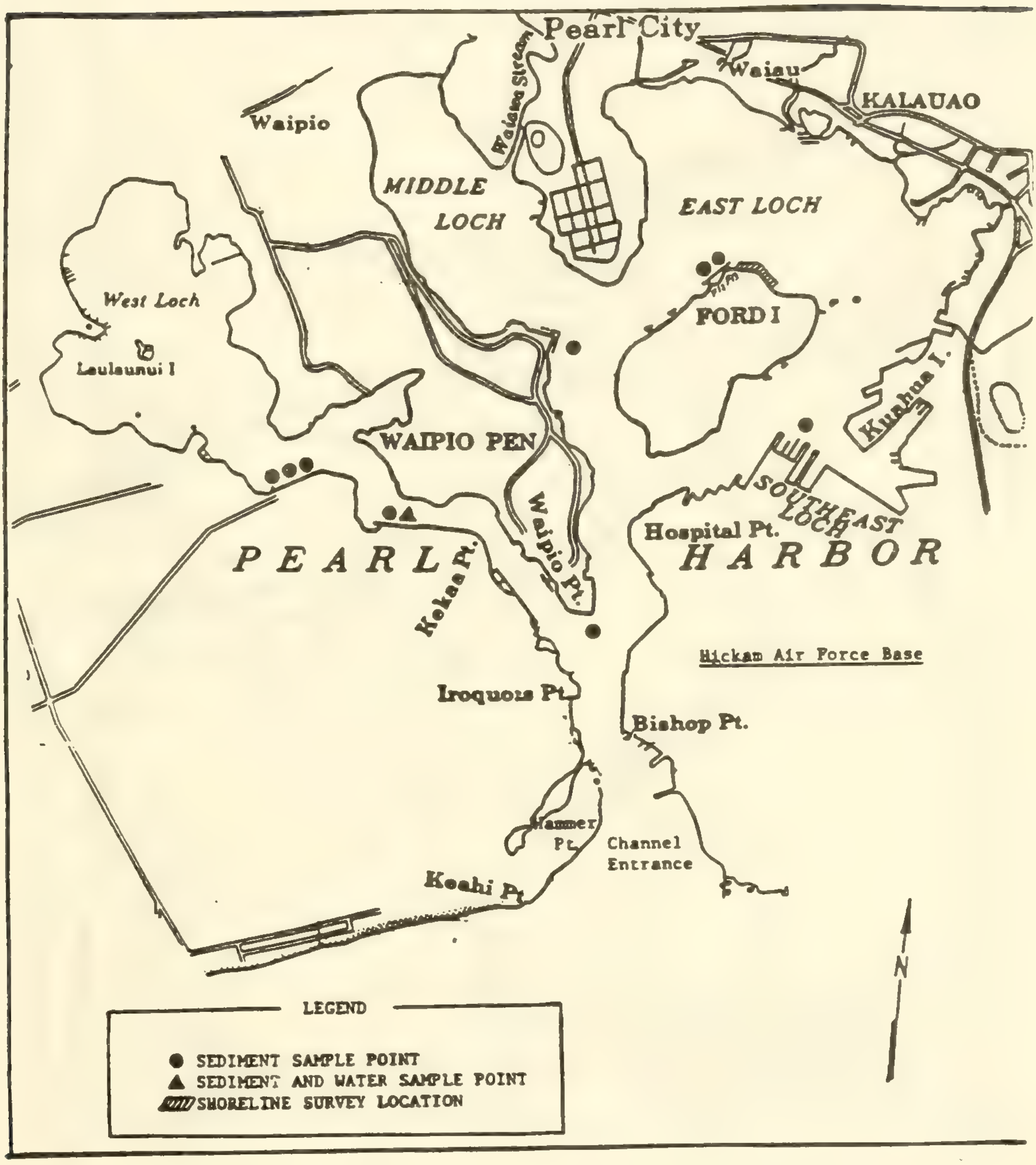
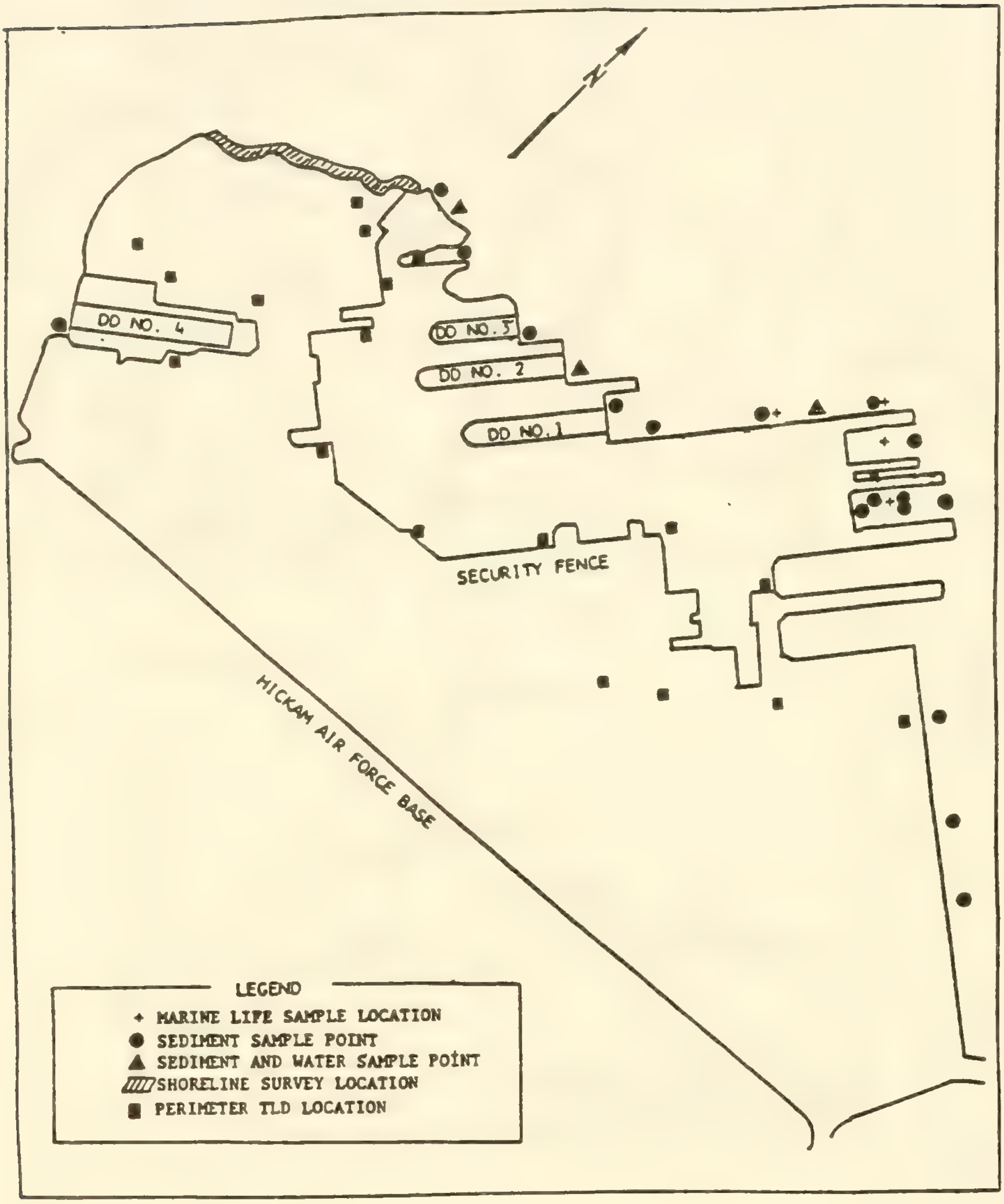


FIGURE 13
ENVIRONMENTAL MONITORING LOCATIONS AT
PEARL HARBOR NAVAL SHIPYARD, PEARL HARBOR, HI



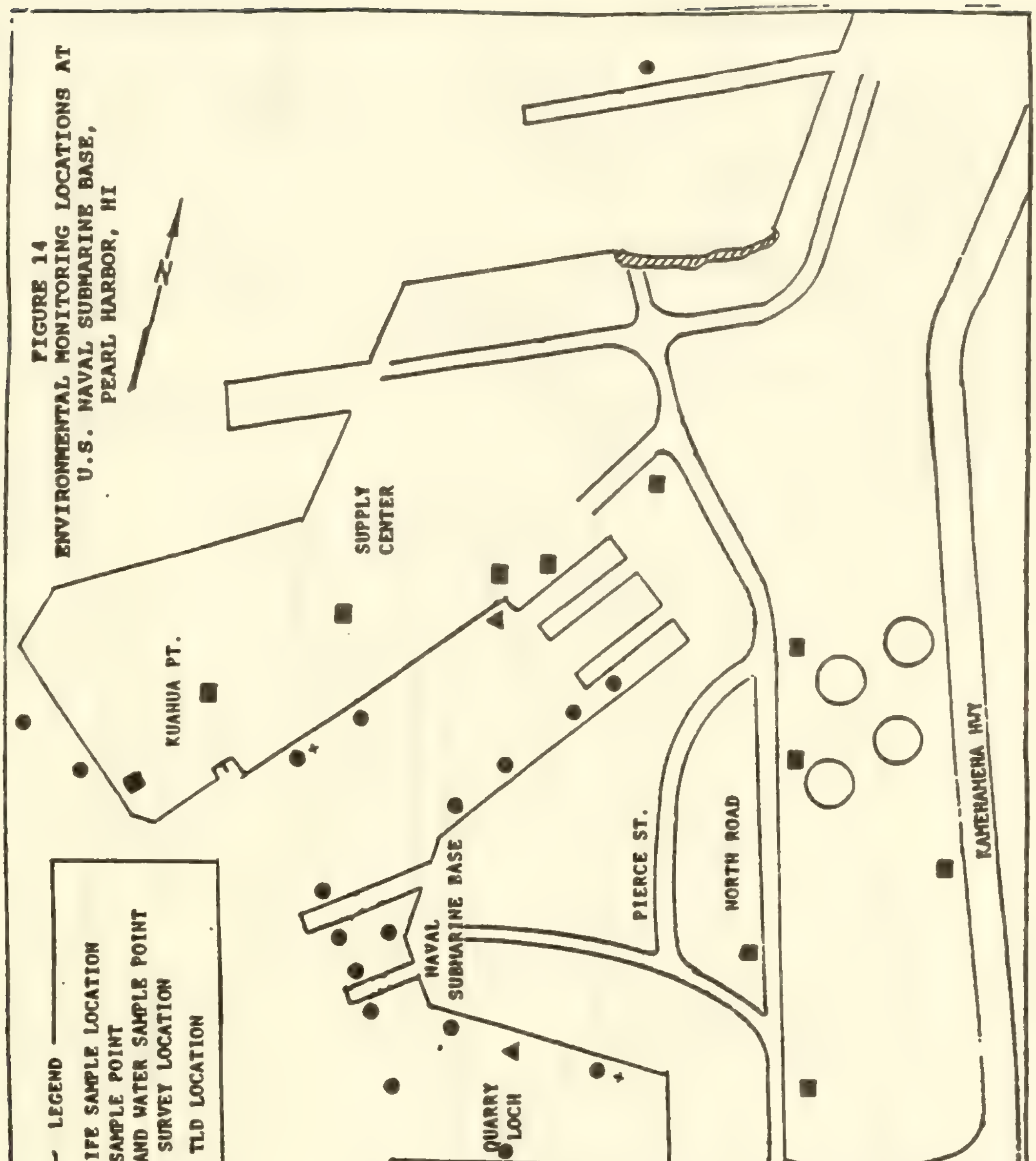


FIGURE 14
ENVIRONMENTAL MONITORING LOCATIONS AT
U.S. NAVAL SUBMARINE BASE,
PEARL HARBOR, HI

FIGURE 15
ENVIRONMENTAL MONITORING LOCATIONS AT
PORTSMOUTH NAVAL SHIPYARD, KITTERY, ME/PORTSMOUTH, NH

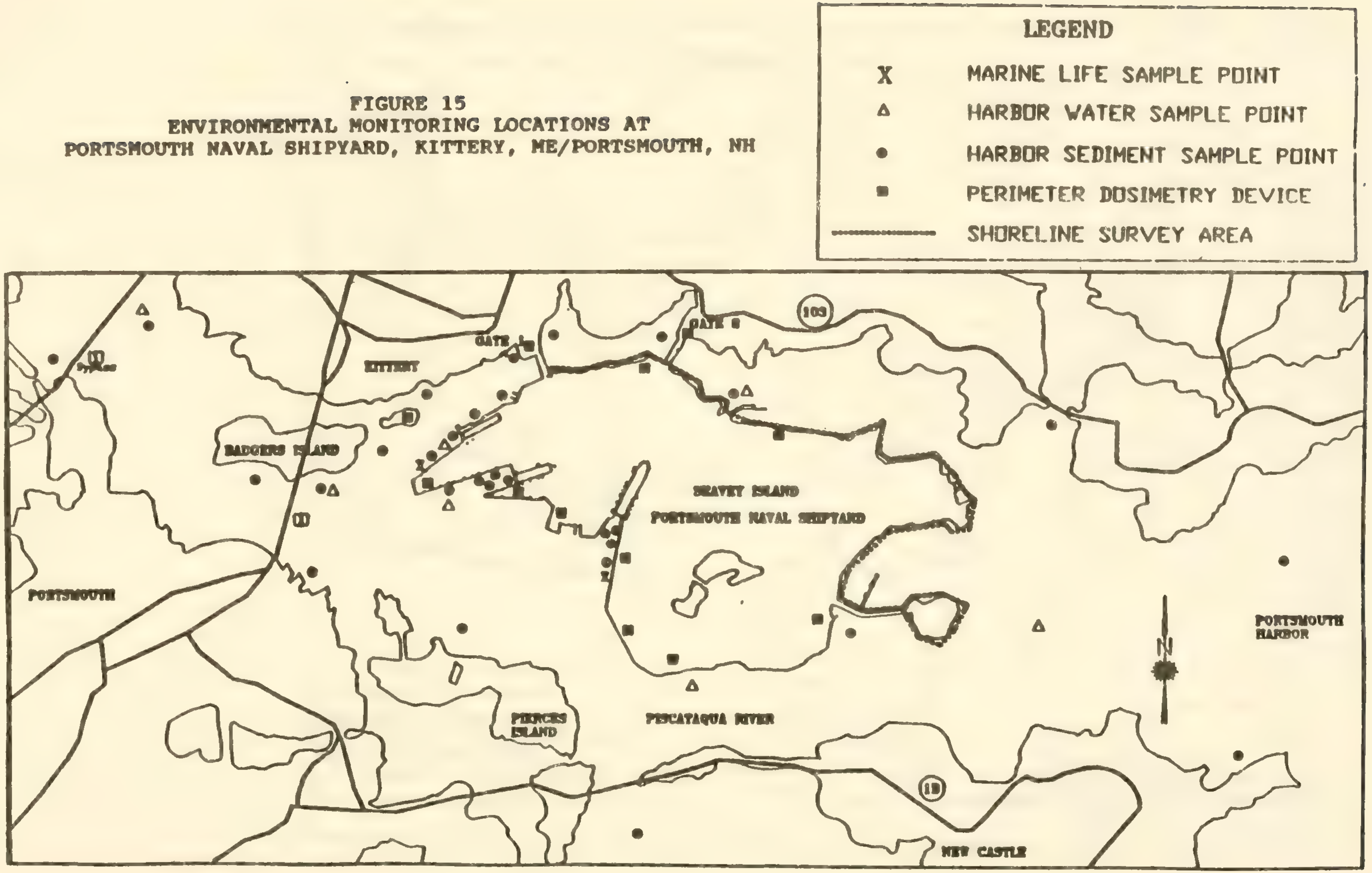


FIGURE 16
ENVIRONMENTAL MONITORING LOCATIONS AT
U.S. NAVAL BASE AND NAVAL SHIPYARD, CHARLESTON, SC

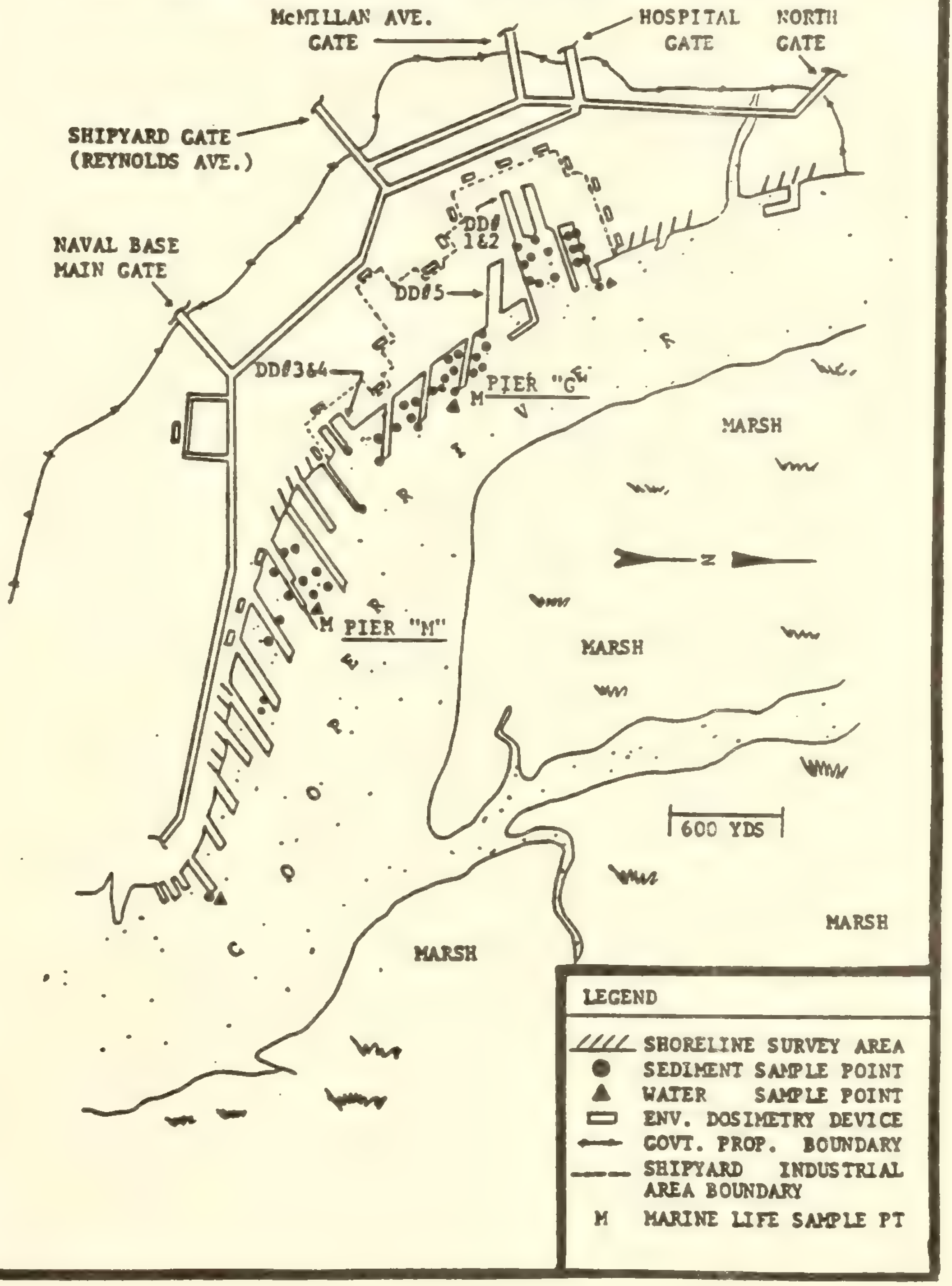


FIGURE 17
ENVIRONMENTAL MONITORING LOCATIONS AT
NAVAL NUCLEAR POWER TRAINING UNIT, CHARLESTON, SC

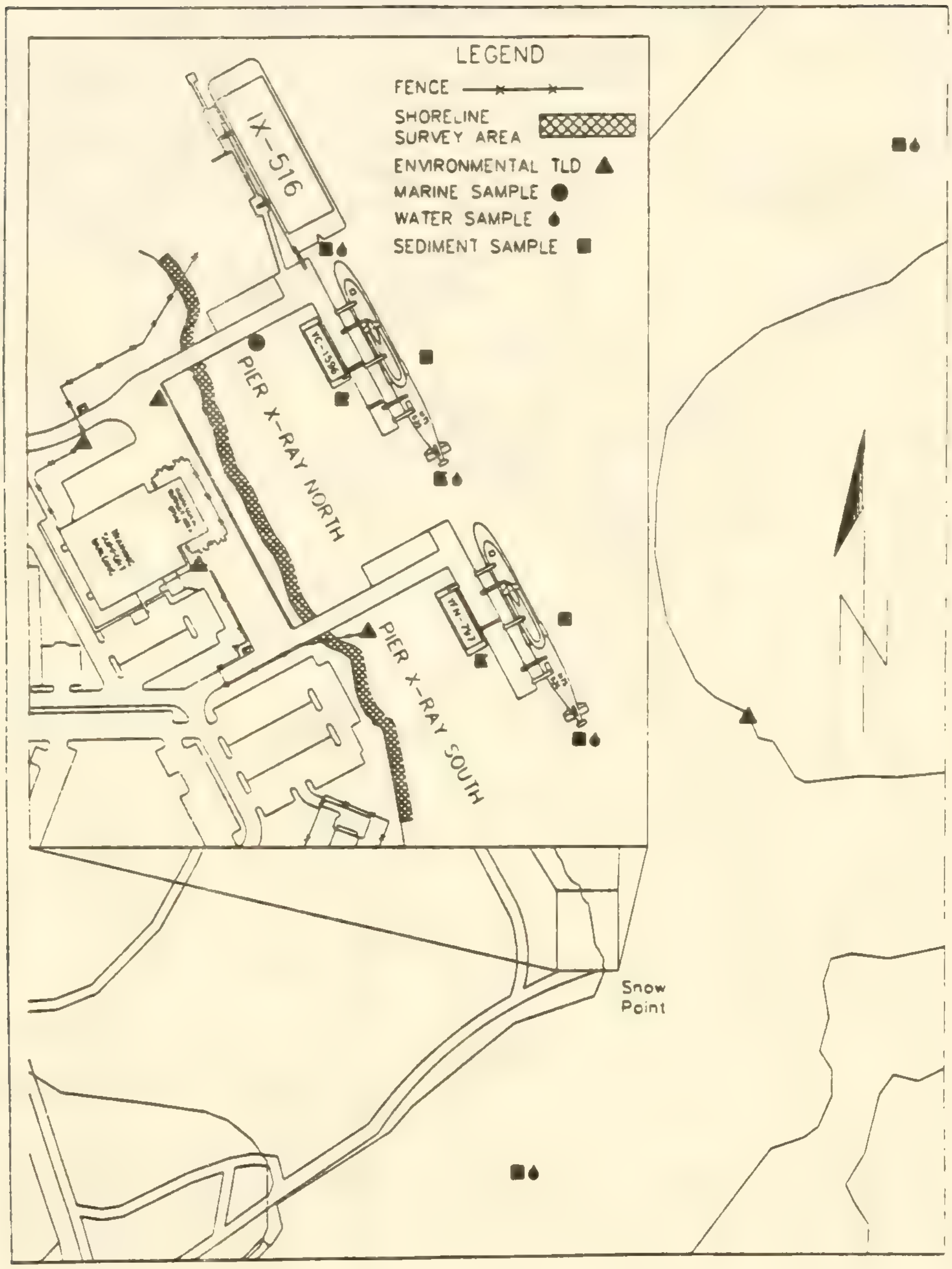


FIGURE 18
ENVIRONMENTAL MONITORING LOCATIONS AT
NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY, NEWPORT NEWS, VA

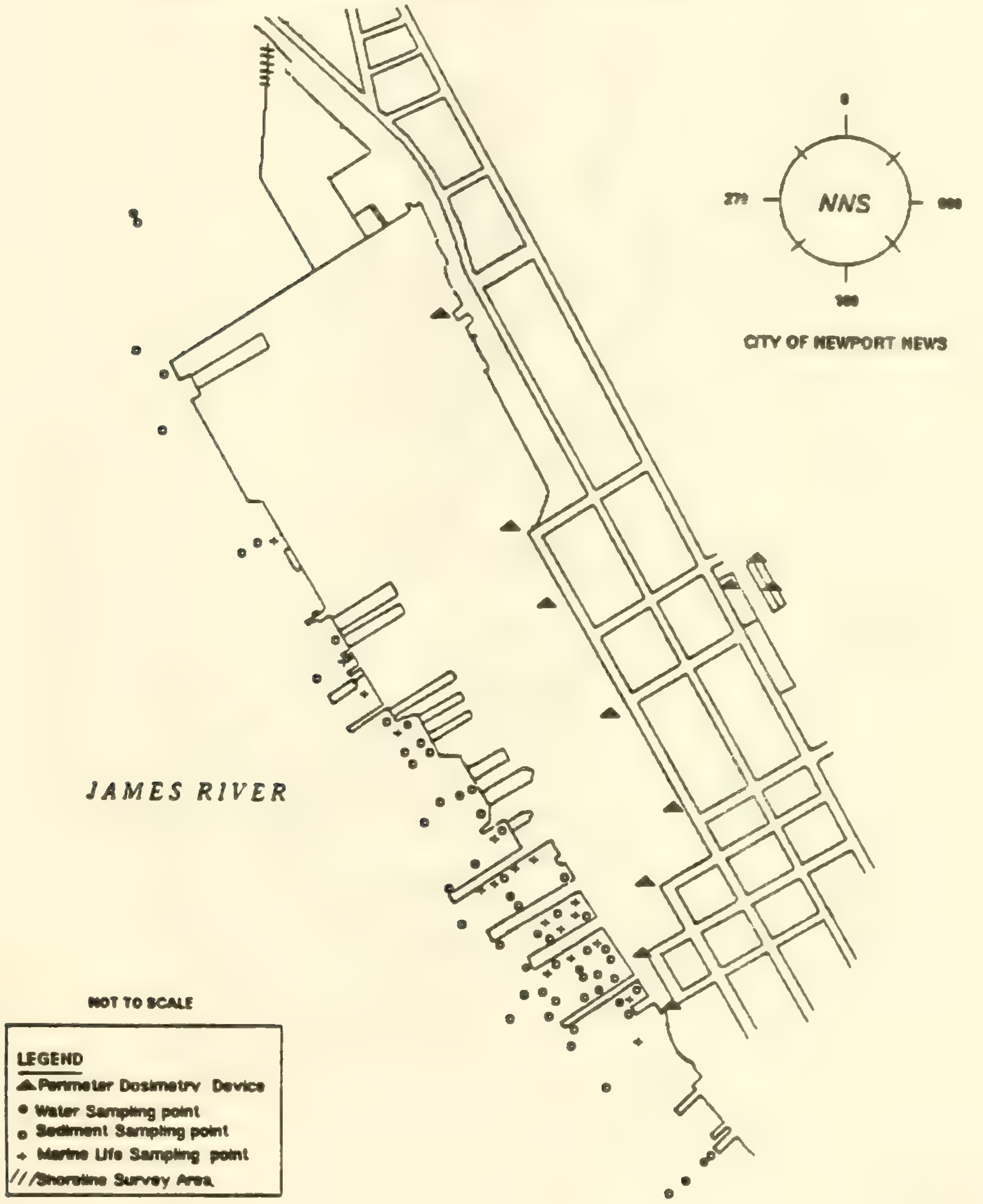

0
270
NNS
090
180
CITY OF NEWPORT NEWS
JAMES RIVER
NOT TO SCALE
LEGEND
▲ Perimeter Dosimetry Device
● Water Sampling point
○ Sediment Sampling point
+ Marine Life Sampling point
/// Shoreline Survey Area

FIGURE 19
ENVIRONMENTAL MONITORING LOCATIONS AT
NORFOLK NAVAL SHIPYARD, PORTSMOUTH, VA

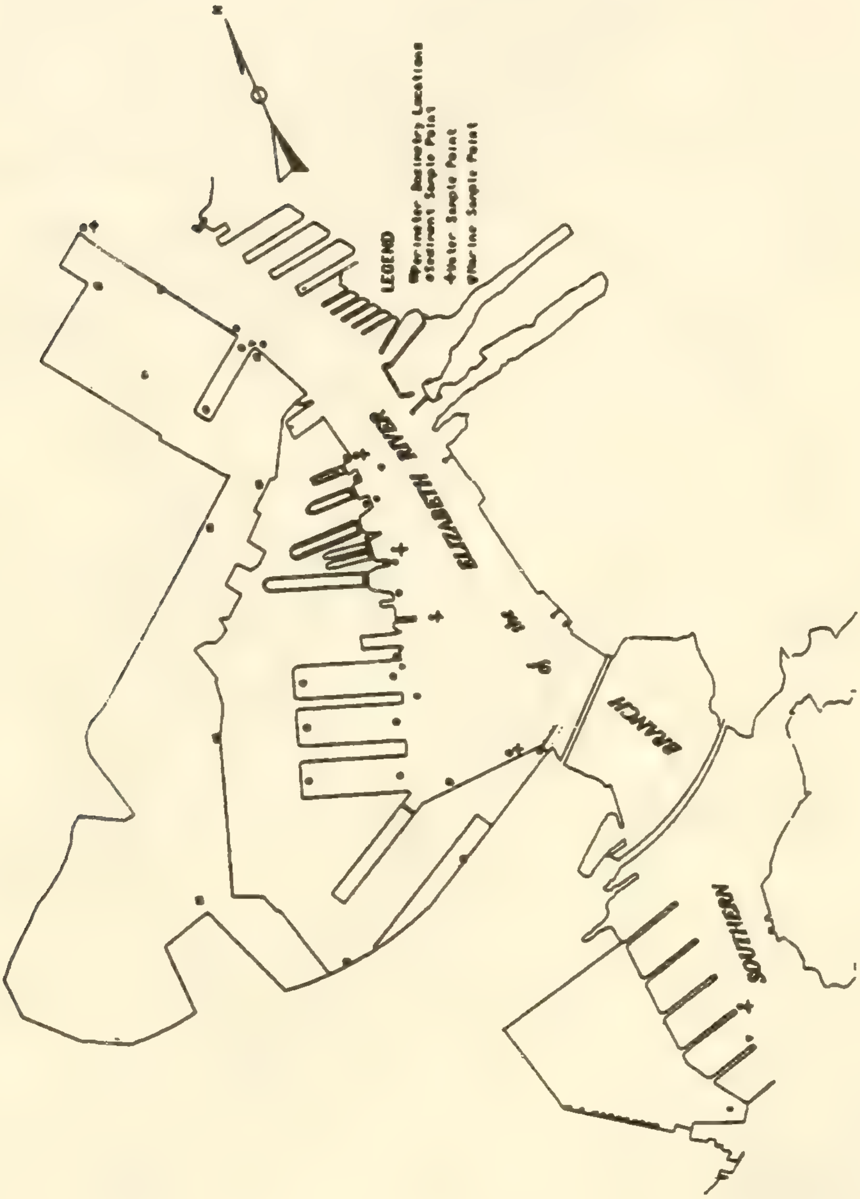
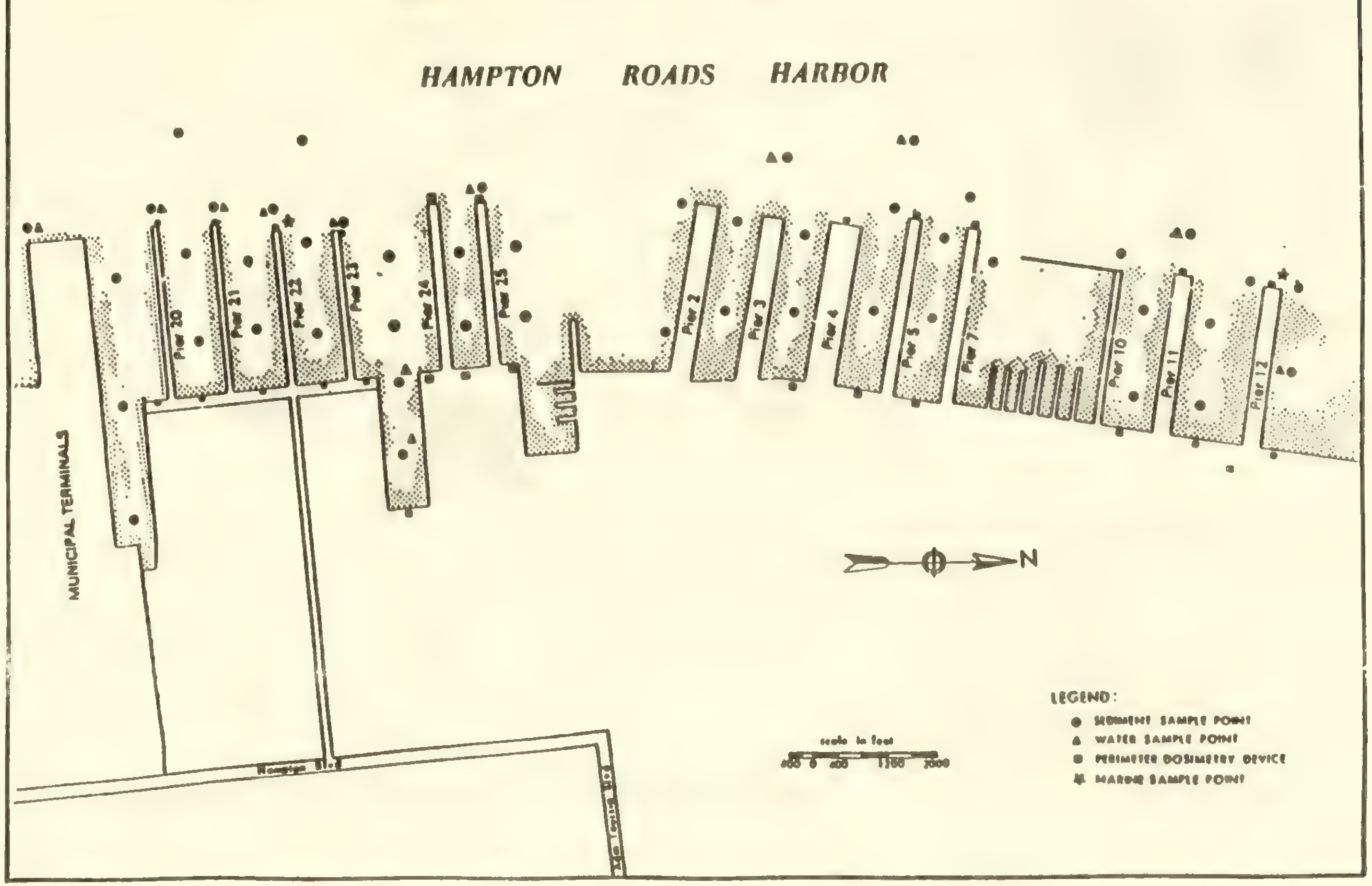


FIGURE 20
ENVIRONMENTAL MONITORING LOCATIONS AT
U.S. NAVAL STATION, NORFOLK, VA



NOFORN

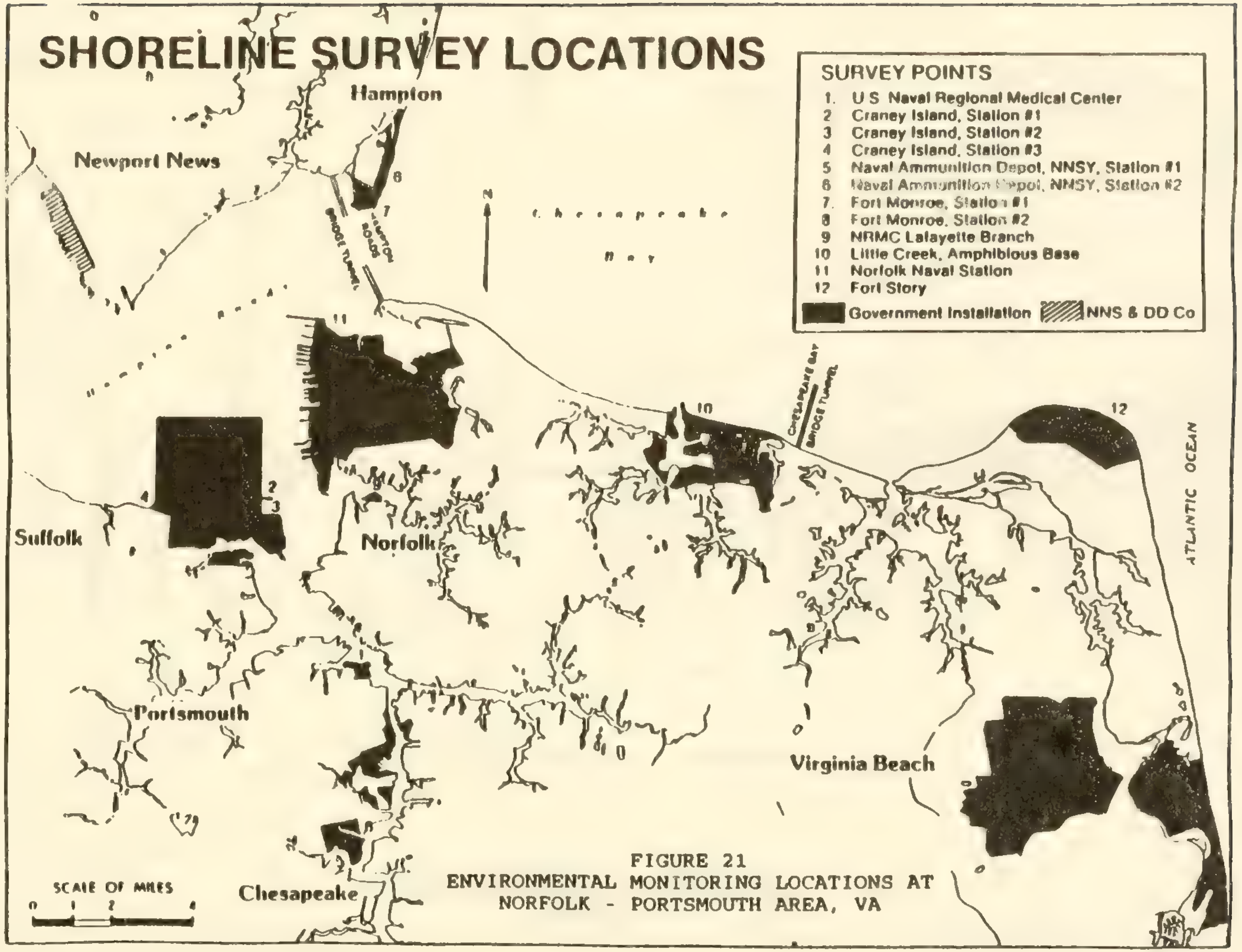
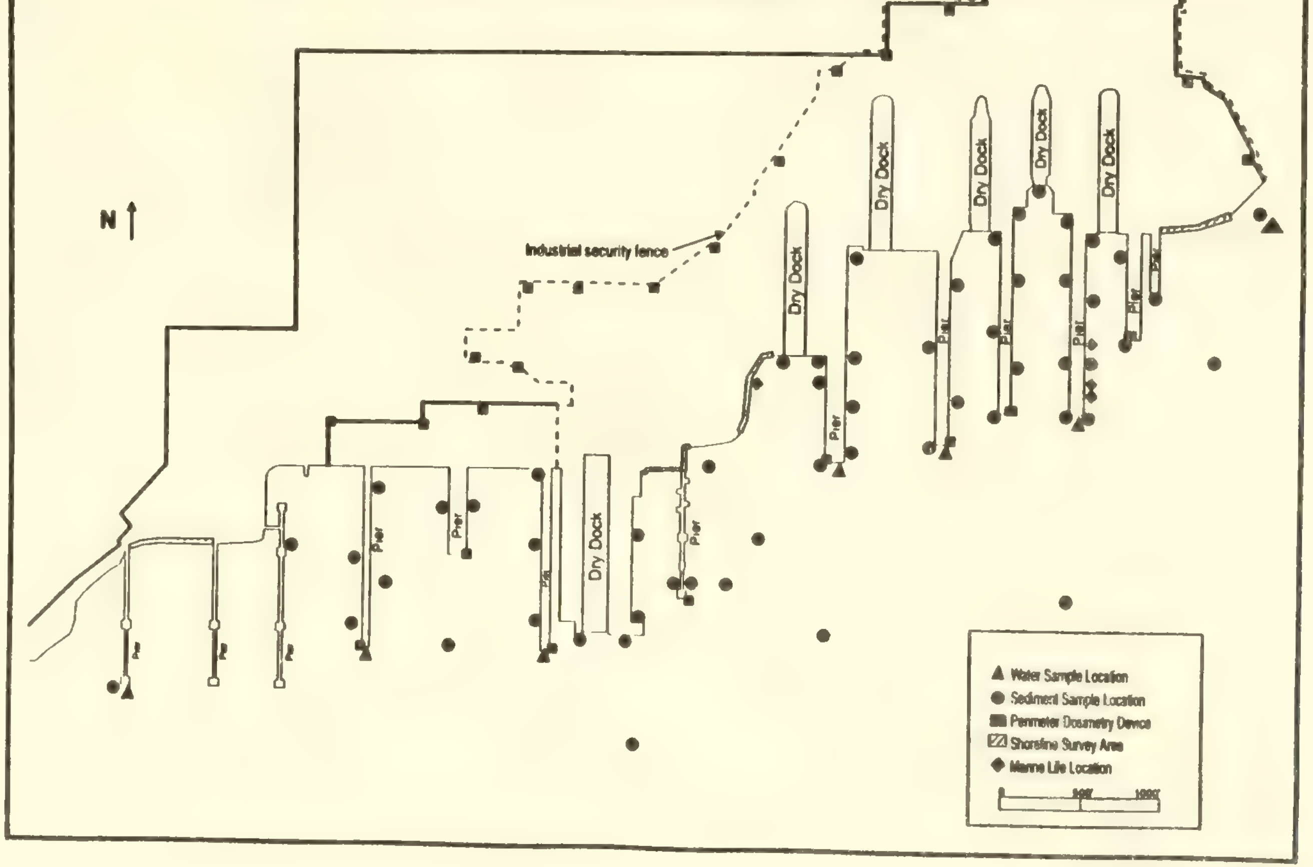

SHORELINE SURVEY LOCATIONS
SURVEY POINTS
1. U S Naval Regional Medical Center
2 Craney Island, Station #1
3 Craney Island, Station #2
4 Craney Island, Station #3
5 Naval Ammunition Depot, NNSY, Station #1
6 Naval Ammunition Depot, NNSY, Station #2
7. Fort Monroe, Station #1
8 Fort Monroe, Station #2
9 NRMC Lafayette Branch
10 Little Creek, Amphibious Base
11 Norfolk Naval Station
12 Fort Story
Government Installation
NNS & DD Co
Hampton
Newport News
Hampton Roads
Bridge Tunnel
N
Chesapeake Bay
Chesapeake Bay Bridge Tunnel
Atlantic Ocean
Suffolk
Norfolk
Portsmouth
Virginia Beach
Chesapeake
SCALE OF MILES
0 1 2 4

FIGURE 21
ENVIRONMENTAL MONITORING LOCATIONS AT
NORFOLK - PORTSMOUTH AREA, VA

FIGURE 22
ENVIRONMENTAL MONITORING LOCATIONS AT
PUGET SOUND NAVAL SHIPYARD, BREMERTON, WA



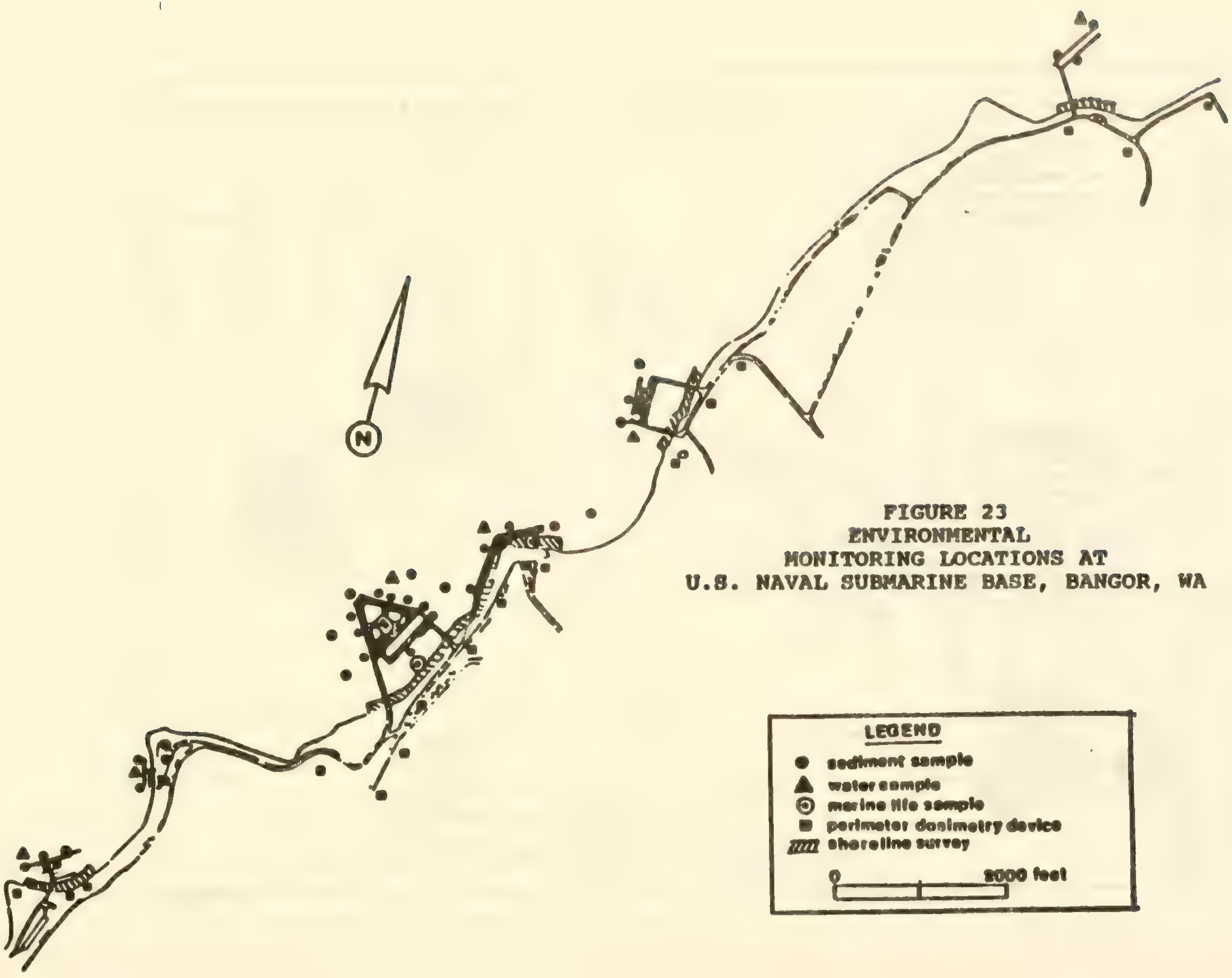


FIGURE 23
ENVIRONMENTAL
MONITORING LOCATIONS AT
U.S. NAVAL SUBMARINE BASE, BANGOR, WA

Report NT-96-2
March 1996

OCCUPATIONAL RADIATION EXPOSURE FROM U. S. NAVAL NUCLEAR PROPULSION PLANTS AND THEIR SUPPORT FACILITIES

1995

Prepared by

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Department of the Navy

Approved by

B. DeMARS
Admiral, U. S. Navy
Director
Naval Nuclear Propulsion

SUMMARY

Radiation exposures to Navy and civilian personnel monitored for radiation associated with U. S. Naval nuclear propulsion plants are summarized in this report. As of the end of 1995, the U.S. Navy operated 96 nuclear-powered submarines, 12 nuclear-powered surface ships and two moored training ships. Support facilities involved in construction, maintenance, overhaul, and refueling of these nuclear propulsion plants include six shipyards, ten tenders and four submarine bases. Additionally, two other shipyards were inactivating radiological facilities to support shipyard closure. The benefits of nuclear propulsion in our most capable combatant ships have long been recognized, and our nuclear-powered ballistic missile submarines form the most invulnerable element of the U. S. strategic deterrent.

Figure 1 shows that the total radiation exposure in 1995 is less than one-eighth of the amount in the peak year of 1966, even though today there are over one and one-half times the number of nuclear-powered ships in operation and almost three times the number of ships in overhaul. Total man-rem in this figure is the sum of the annual exposures of each person monitored for radiation.

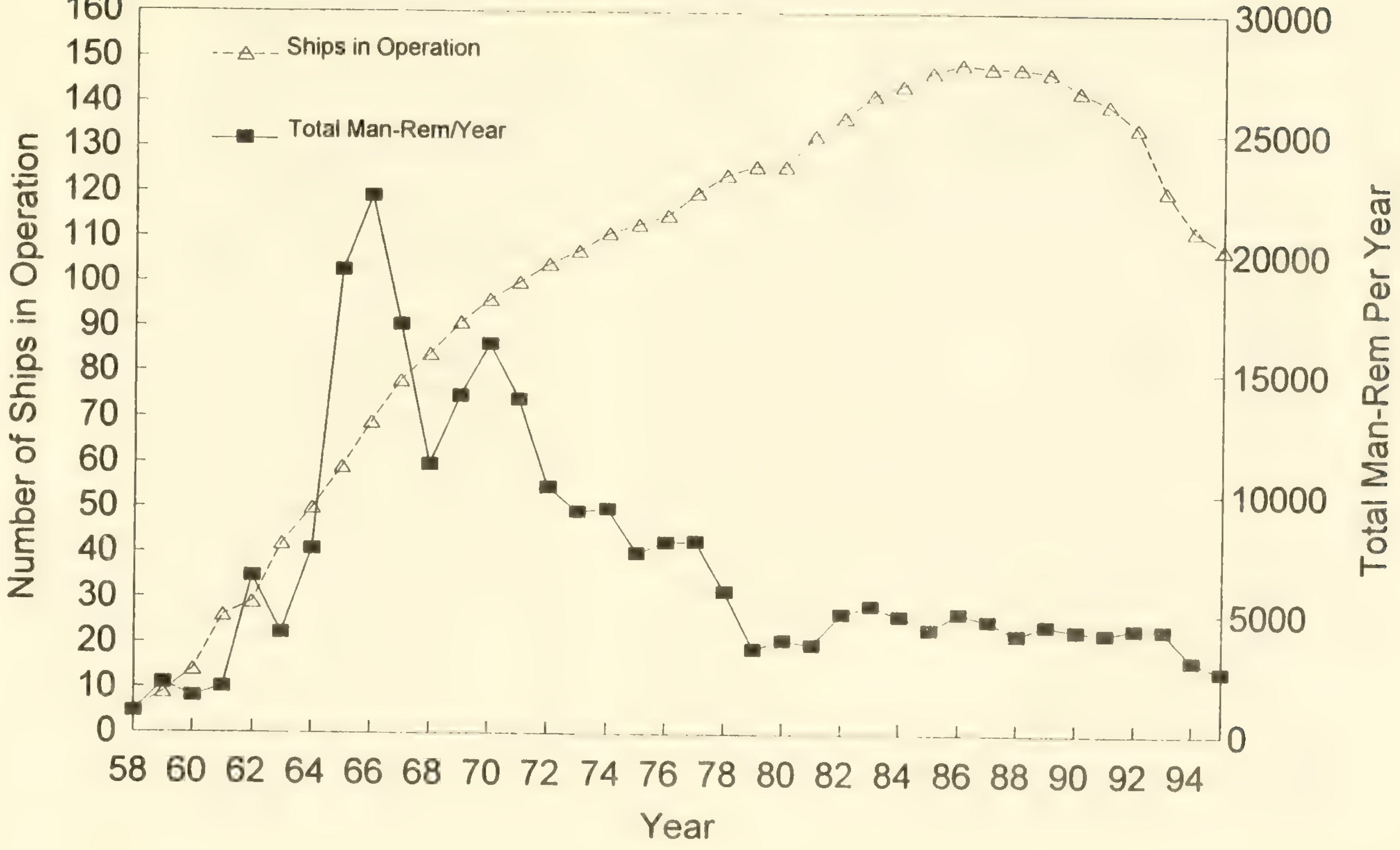
No civilian or military personnel in the Naval Nuclear Propulsion Program have ever exceeded the Federal accumulated limit which allows five rem exposure for each year of age beyond age eighteen. Since 1967, no person has exceeded the Federal limit which allows up to three rem per quarter year, nor in this period has anyone exceeded the Navy's self-imposed limit of 5 rem per year for radiation associated with Naval nuclear propulsion plants.

No civilian or military personnel in the Naval Nuclear Propulsion Program have ever received more than one-tenth the Federal annual occupational exposure limit from internal radiation exposure caused by radioactivity associated with Naval nuclear propulsion plants.

The average occupational exposure of each person monitored is less than one-sixth of a rem per year. The total lifetime exposure from radiation associated with Naval nuclear propulsion plants to date for all personnel monitored since 1954 has averaged about one rem per person.

According to the standard methods for estimating risk, the risk to the group of personnel occupationally exposed to radiation associated with Naval nuclear propulsion plants is less than the risk these same personnel have from exposure to natural background radiation or to medical radiation. This risk is small compared to the risks accepted in normal industrial activities, and it is small compared to the risks regularly accepted in daily life outside work.

FIGURE 1
TOTAL RADIATION EXPOSURE RECEIVED BY MILITARY AND CIVILIAN PERSONNEL IN THE NAVAL NUCLEAR PROPULSION PROGRAM 1958 - 1995



EXTERNAL RADIATION EXPOSURE

Policy and Limits

The policy of the U. S. Naval Nuclear Propulsion Program is to reduce as low as reasonably achievable, exposure to personnel from ionizing radiation associated with Naval nuclear propulsion plants.

The radiation exposure limits used in the U. S. for whole body radiation exposure are 3 rem[1] per quarter year and 5 rem accumulated dose for each year beyond age eighteen. These limits were recommended in 1958 by the U. S. National Committee ("Committee" was changed to "Council" when the organization was chartered by the U. S. Congress in 1964) on Radiation Protection and Measurements (ref 1) and by the International Commission on Radiological Protection (ref 2). They were adopted by the U. S. Atomic Energy Commission (AEC) and applied both within the AEC and to licensees in 1960 (ref 3). The U. S. Federal Radiation Council recommendation that these be used as guidance for Federal agencies was approved by President Eisenhower on May 13, 1960 (ref 4). The U. S. Department of Labor adopted these same limits. A key part of each of these standards has been emphasis on minimizing radiation exposure to personnel.

In 1965, the International Commission on Radiological Protection (ref 5) reiterated the quarterly and accumulated limits cited above but suggested that exceeding 5 rem in one year should be infrequent. Although none of the other organizations referred to above changed its recommendations accordingly, the Naval Nuclear Propulsion Program adopted 5 rem per year as a rigorous limit effective in 1967.

In 1971, the National Council on Radiation Protection and Measurements (ref 6) recommended that 5 rem be adopted as the annual limit under most conditions. In 1974, the AEC (now Department of Energy) (ref 7) established 5 rem as its annual limit. In 1977, the International Commission on Radiological Protection (ref 8) deleted the accumulated limit and recommended 5 rem as the annual limit. In 1979, the Nuclear Regulatory Commission issued a proposed change to the Code of Federal Regulations Title 10, Part 20 to require its licensees to use 5 rem as an annual limit. On January 20, 1987, revised guidance for Federal agencies was approved by President Reagan which eliminated the accumulated dose limit discussed above and established a 5 rem per year limit for occupational exposure to radiation (ref 9). Recently, the Nuclear Regulatory Commission approved the change to the Code of Federal Regulations, Title 10, Part 20 that makes the 5 rem annual limit effective on or before January 1, 1994.

References are listed on pages 58 through 61.

[1] 1 rem = 0.01 Sievert

The Naval Nuclear Propulsion Program radiation exposure limits since 1967 have been:

3 rem per quarter year
5 rem per year

Special limits are in effect such as for hands and feet; however, there have been few cases where these limits have been more restrictive than the whole body radiation exposure limits. Therefore, the radiation exposures discussed in this report are nearly all from whole body radiation. Controls are also in effect to minimize any occupational radiation exposure to the unborn child of a pregnant worker.

Each organization in the Naval Nuclear Propulsion Program is required to have an active program to reduce radiation exposure to the minimum practicable.

Source of Radiation

The radiation discussed in this report originates from pressurized water reactors. Water circulates through a closed piping system to transfer heat from the reactor core to a secondary steam system isolated from the reactor cooling water. Trace amounts of corrosion and wear products are carried by reactor coolant from reactor plant metal surfaces. Some of these corrosion and wear products are deposited on the reactor core and become radioactive from exposure to neutrons. Reactor coolant carries some of these radioactive products through the piping systems where a portion of the radioactivity is removed by a purification system. Most of the remaining radionuclides transported from the reactor core deposit in the piping systems.

The reactor core is installed in a heavy-walled pressure vessel within a primary shield. This shield limits radiation exposure from the gammas and neutrons produced when the reactor is at power. Reactor plant piping systems are installed primarily inside a reactor compartment which is surrounded by a secondary shield. Access to the reactor compartment is permitted only after the reactor is shut down. Most radiation exposure to personnel comes from inspection, maintenance, and repair inside the reactor compartment. The major source of this radiation is cobalt-60 deposited inside the piping systems. Cobalt-60 emits two high energy gammas and a low energy beta for every radioactive decay. Its half-life is 5.3 years.

Neutrons produced when reactor fuel fissions are shielded by both primary and secondary shields before penetrating to occupied areas. Radiation exposure to personnel from these neutrons during reactor operation has been much less than from gammas. After reactor shutdown, when shipyard and other support facility work is done, no neutron exposure is detectable. As a result, the radiation exposures discussed in this report are nearly all from gamma radiation.

Control of Radiation During Reactor Plant Operation

Reactor plant shielding is designed to minimize radiation exposure to personnel. Shield design criteria establishing radiation levels in various parts of each nuclear-powered ship are personally approved by the Director of the Naval Nuclear Propulsion Program.

Ship design is also controlled to keep locations, such as duty stations where personnel need to spend time, as far as practicable away from the reactor compartment shield. Special attention is paid to living quarters. For example, the shield design criteria were established such that a person would have to spend more than 48 hours per day in living quarters to exceed exposure limits (which is impossible since there are only 24 hours in a day).

Resulting radiation outside propulsion plant spaces during reactor plant operation is generally not any greater than natural background radiation. For submarine operating personnel outside the propulsion plant, the combination of low natural radioactivity in ship construction materials and reduced cosmic radiation under water results in less radiation exposure from the nuclear reactor at sea than the public receives from natural background sources ashore. Those who operate the nuclear propulsion plant receive more radiation exposure in port during maintenance and overhaul periods than they receive from operating the propulsion plant at sea.

Control of Radiation in Support Facilities

Tenders for nuclear-powered submarines and surface ships are designed so that radioactive material is handled only in specially designed and shielded nuclear support facilities. Submarine bases and shipyards limit to the minimum, the number of places where radioactive material is allowed. Specific traffic routes are required to be used for any movement of radioactive material outside these nuclear support facilities. A radioactive material accountability system is used to ensure no radioactive material is lost or misplaced in a location where personnel could unknowingly be exposed. Regular inventories are required for every item in the radioactive material accountability system. Radioactive material is tagged with yellow and magenta tags bearing the standard radiation symbol and the measured radiation level. Radioactive material removed from a reactor plant is required to be placed in yellow plastic, and the use of yellow plastic is reserved solely for radioactive material. All personnel assigned to a tender, submarine base or shipyard are trained to recognize that yellow plastic identifies radioactive material and to initiate immediate action if radioactive material is discovered out of place.

Access to radiation areas is controlled by posted signs and barriers. Personnel are trained in the access requirements, including the requirement to wear dosimetry devices to enter these areas. Dosimetry devices are also posted near the boundaries of these areas to verify that personnel outside these areas do not require monitoring. Frequent radiation surveys are required using instruments which are checked before use and calibrated regularly. Areas where radiation levels are greater than 0.1 rem per hour are called high radiation areas and are locked or guarded. Compliance with radiological controls requirements is checked frequently by radiological controls personnel and other personnel not affiliated with the radiological controls organization.

Dosimetry

Thermoluminescent dosimeters (TLDs) have been the dosimetry devices worn by personnel to measure their exposure to gamma radiation, since 1974. Prior tq 1974, film badges were used as described in detail below. The TLD contains two chips of calcium fluoride with added manganese. It is characteristic of thermoluminescent material that radiation causes internal changes which make the material, when subsequently heated, give off an amount of light directly proportional to the radiation dose. In order to make it convenient to handle, these chips of calcium fluoride are in contact with a metallic heating strip with heater wires extending through the ends of a surrounding glass envelope. The glass bulb is protected by a plastic case designed to permit the proper response to gammas of various energies. Gammas of such low energy that they will not penetrate the plastic case constitute less than a few percent of the total gamma radiation present. To read the radiation exposure, a trained operator removes the glass bulb and places it in a TLD reader so that the metal heater wires contact an electrical circuit. An electronically controlled device heats the calcium fluoride chips to several hundred degrees centigrade in a timed cycle, and the intensity of light emitted is measured and converted to a digital readout in units of rem. The heating cycle also anneals the calcium fluoride chips so that the dosimeter is zeroed and ready for subsequent use. The entire cycle of reading a TLD described here takes about thirty seconds. This rapid readout capability was one reason for changing from film badges to TLDs. The use of TLDs permits more frequent measurement of a worker's radiation exposure than film badges. TLDs are required to be processed at least daily in Naval shipyards. Aboard ship, TLDs are required to be processed at least monthly except that daily processing is required for anyone entering a reactor compartment or high radiation area.

To ensure accuracy of the TLD system, several periodic calibration and accuracy checks are performed. For example, TLDs are checked when new and once every six months thereafter for accurate response to a known radiation exposure. Those that fail are discarded. TLD readers are calibrated once each year to verify accuracy by one of several calibration facilities having precision radiation sources and precision TLD standards. In addition, weekly, daily and hourly checks of proper TLD reader operation and accuracy are performed when readers are in use utilizing internal electronic standards built into each reader.

In addition to these calibrations and checks, the Navy has an independent dosimetry quality assurance program to monitor the accuracy of TLDs and TLD readers in use at Program activities. Precision TLDs are pre-exposed to exact amounts of radiation by the National Institute of Standards and Technology, formerly the National Bureau of Standards, and provided to Program activities for reading. The activity's results are then compared to the actual exposures. A random sample of dosimeters in use at the activity being tested is also selected and sent to a Navy shore facility for accuracy testing. To assure objectivity, the activity being tested is not told of the radiation values to which the dosimeters have been exposed and is not permitted to participate in the selection of the dosimeter sample. Any inaccuracies found by these tests that exceed established permissible error bands result in appropriate corrective action such as recalibration of a failed TLD reader. The results of this program demonstrate that the radiation to which personnel are exposed is being measured by the TLD system with an average error of less than 10%.

The Naval Nuclear Propulsion Program dosimetry system is accredited under the National Voluntary Laboratory Accreditation Program. This voluntary program, sponsored by the National Institute of Standards and Technology, provides independent review of dosimetry services for consistency with accepted standards.

Pocket ionization chambers with an eyepiece permit the wearer to read his own radiation exposure. This pocket dosimeter is required in addition to a TLD when entering a reactor compartment or a high radiation area. Pocket dosimeters are used to enable the wearer to keep track of his own radiation exposure during a work period. The official record of radiation exposure is obtained from the TLD.

Dosimetry devices are worn on the trunk of the body, normally at the waist or chest. In some special situations dosimeters are worn at other locations, for example on the hands or fingers or head.

Discrepancies between TLD and pocket dosimeter measurements are investigated. These investigations include making independent estimates of the worker's exposure using such methods as time spent in the specific radiation area and comparing the estimates with the TLD and pocket dosimeter measurements to determine which measurement is most accurate.

In 1974, the conversion from film badges to TLDs for measuring radiation exposure was completed. Prior to this time, film packets like those used for dental x-rays were placed in holders designed to allow differentiating between types of radiation. The darkness of the processed film was measured with a densitometer and converted to units of radiation exposure. When the first personnel radiation exposures were measured in the Naval Nuclear Propulsion Program, there already was widespread photodosimetry experience in the Navy and precise procedures existed to provide reproducible results.

Each film badge was clearly marked with a name or number corresponding to the individual to whom it was assigned. This number was periodically checked by a radiological controls technician before a worker entered a high radiation area. In high radiation areas every worker also wore a pocket dosimeter which was read by radiological controls personnel when the worker left the area. At the end of each month when the film badges were processed, the film badge measurements were compared with the sum of the pocket dosimeter readings. The film badge results were, with few exceptions, entered in the permanent personnel radiation exposure records.

Results of numerous tests conducted by shipyards under the same conditions that most radiation exposure was received showed that film measurements averaged fifteen percent higher than actual radiation exposures. This was a conscious conservatism to ensure that under the worst case, the film measurement was not less than the actual radiation exposure. Film response varies with the energy of the gamma radiation. The calibration of the film was performed at high energy where the film has the least response to radiation exposure. Radiation of lower energies corresponding to scattered radiation from shielded cobalt-60 causes the film to indicate more radiation exposure than is present.

Data gathered in over 20 years of neutron monitoring aboard ships using neutron film badges demonstrated that the monitored individuals did not receive neutron exposure above the minimum detection level for neutron film. Naval nuclear-powered ships and their support facilities now use lithium fluoride TLDs to monitor neutron exposure of the few personnel exposed to neutron sources such as for radiation instrument calibration and for reactor plant instrumentation source handling. These measured neutron exposures have been added to gamma exposures in the total whole body radiation exposure in this report, but because neutron exposures are so low, the radiation exposures in this report are almost entirely from gamma radiation.

Monitoring for beta radiation is not normally required because betas cannot penetrate the metal boundaries of the reactor coolant system. Beta radiation needs to be considered in maintenance or repair operations only when systems are opened so that personnel are close to surfaces which have been contaminated with radioactive corrosion products from reactor coolant. In these cases anticontamination clothing, faceshields, or plastic contamination control materials completely shield beta radiation of the energies normally present. Support facilities routinely provide such materials to eliminate personnel radiation exposure from betas.

Monitoring for alpha radiation is not a normal part of operation or maintenance of Naval nuclear propulsion plants. However, alpha monitoring is sometimes necessary to identify radon daughter products naturally present in the atmosphere.

Physical Examinations

Radiation medical examinations have been required since the beginning of the Naval Nuclear Propulsion Program for personnel exposed to radiation. These examinations are conducted in accordance with the Navy's Radiation Health Protection Manual (ref 10). In these examinations the doctor pays special attention to any condition which might medically disqualify a person from receiving occupational radiation exposure or pose a health or safety hazard to the individual, co-workers, or to the safety of the workplace. Passing this examination is a prerequisite for obtaining dosimetry which permits entry to areas where radiation exposure can be received. For military personnel who have already been screened by physical examinations, few fail this radiation medical examination. For civilian shipyard workers, the failure rate is a few percent. However, failure of this examination does not mean a shipyard worker will not have a job. Since shipyard workers spend most of their time on non-radioactive work, inability to qualify for radioactive work does not restrict their job opportunities. No shipyard worker in the Naval Nuclear Propulsion Program has been fired for inability to pass a radiation medical examination.

Radiation medical examinations are given prior to initial radiation work, periodically thereafter depending on the worker's age, and at termination of radioactive work in the Naval Nuclear Propulsion Program (or at termination of employment). The periodic examinations are conducted in accordance with the following frequencies:

Age	Interval
18-24	Pre-placement
25-49	5 years
50-59	2 years
≥60	1 year

A radiation medical examination includes review of medical history to determine, among other subjects, past radiation exposure, history of cancer, history of radiation therapy, and family history of cancer. In the medical examination, particular attention is paid to evidence of cancer or precancerous condition. Laboratory procedures include urinalysis, blood analysis, and comparison of blood constituents to a specific set of standards. In the event disqualifying conditions are found in an examination of Naval civilian or military personnel, the individual is barred from receiving occupational radiation exposure and the results of the examination are reviewed by the Bureau of Medicine and Surgery's Radiation Effects Advisory Board. Only after approval of the Board would the individual be permitted to receive occupational radiation exposure.

Shipyard, Tender, and Submarine Base Training

Periodic radiological controls training is performed to ensure each person understands the general and specific radiological aspects which he might encounter, understands his responsibility to the Navy and the public for safe handling of radioactive materials, understands the risks associated with radiation exposure, and understands his responsibility to minimize his own radiation exposure. Training is also provided on the biological risk of radiation exposure to the unborn child. Prior to being authorized to perform radioactive work, an employee is required to satisfactorily complete a radiological controls training course, including a written examination. Typical course lengths for workers range from 16 to 32 hours. In written examinations on radiological controls, short answer questions, such as multiple choice and true-false questions, are prohibited. The following are the minimum training requirements for workers:

1. Radiation Exposure Control:

    a. State the limits for whole body penetrating radiation. Explain that the rem is a unit of biological dose from radiation.

    b. Discuss the importance of the individual keeping track of his/her own exposure. Know how to obtain year-to-date exposure information.

    c. Know that local administrative control levels are established to maintain personnel radiation exposure as low as reasonably achievable. Know your own exposure control level and who can approve changes to this level.

    d. Discuss procedures and methods for minimizing exposure such as working at a distance from a source, reducing time in radiation areas, and using shielding.

    e. Know that a worker is not authorized to move, modify, or add temporary shielding without specific authorization.

    f. Discuss potential sources of radiation associated with work performed by the individual's trade.

    g. Discuss the action to be taken if an individual loses dosimetry equipment while in a posted radiation or high radiation area.

    h. Discuss how to obtain and turn in dosimetry equipment.

i. Know that thermoluminescent dosimetry equipment is required to be worn on the portion of the individual's body that receives the highest exposure and that pocket dosimeters are worn at the same location on the body as the thermoluminescent dosimetry. Know that only radiological controls personnel can authorize movement of dosimetry equipment from areas of the body where dosimetry is normally worn (such as the chest or waist) to other areas of the body.

j. Be aware of the seriousness of violating instructions on radiation warning signs and unauthorized passage through barriers.

k. Explain how "stay times" are used.

l. Know that Naval nuclear work at a facility has no significant effect on the environment or on personnel living adjacent to or within the facility.

m. Explain the risk associated with personnel radiation exposure. Know that any amount of radiation exposure, no matter how small, might involve some risk; however, exposure within accepted limits represents a risk that is small compared with normal hazards of life. The National Council on Radiation Protection and Measurements has stated that while exposures of workers and the general population should be kept to the lowest practicable levels at all times, the presently permitted exposures limit the risk to a reasonable level in comparison to nonradiation risks. Know that cancer is the main potential health effect of receiving radiation exposure. Know that any amount of radiation exposure to the unborn child, no matter how small the exposure, might involve some risk; however, exposure of the unborn child within accepted limits represents a risk that is small when compared with other risks to the unborn child. Know that the risk to future generations (genetic effect) is considered to be even smaller than the cancer risk and that genetic effects have not been observed in humans.

n. Know how often an individual shall read his/her pocket dosimeter while in a posted high radiation area. Know that worker shall leave a posted high radiation area when his/her pocket dosimeter reaches three quarters scale or when a preassigned exposure is reached, whichever is lowest.

o. Know that stay times and predetermined pocket dosimeter readings are assigned when working in radiation fields of 1 rem/hour or greater. Know that the worker shall leave the work area when either the assigned stay time or pocket dosimeter reading is reached.

2. Contamination Control:

   a. Discuss how contamination is controlled during radioactive work (e.g., containment in plastic bags and use of contamination containment areas). Explain that these controls limit exposure to internal radioactivity to insignificant levels.

   b. Discuss how contamination is detected on personnel.

   c. Discuss how contamination is removed from objects and personnel.

   d. Discuss potential sources of contamination associated with work performed by the individual's trade.

   e. State the beta-gamma surface contamination limit. Discuss the meaning of the units of the limit.

   f. Explain what radioactive contamination is. Explain the difference between radiation and radioactive contamination.

   g. For personnel who are trained to wear respiratory protection equipment, state the controls for use of such equipment. State the limits for airborne particulate radioactivity.

   h. Discuss the required checks to determine whether personnel contamination monitoring equipment is operational prior to conducting personnel monitoring. Discuss the action to be taken if the checks indicate the equipment is not operating properly.

   i. Discuss the actions to be taken if personnel contamination monitoring equipment alarms while conducting personnel monitoring.

   j. Discuss the procedure to package and remove a contaminated item from a controlled surface contamination area.

   k. Know that no health effects are expected from receiving radioactive contamination associated with Naval nuclear propulsion plants on the skin.

3. Accountability of Radioactive Materials: Know that radioactive materials are accounted for when transferred between radiologically controlled areas by tagging, by tracking location, and through the use of radioactive material escorts.

4. Waste Disposal:

    a. Discuss how individual workers can reduce the amount of radioactive liquid and solid waste generated for the specific type of duties performed.

    b. Discuss the importance of proper segregation of non-contaminated, potentially contaminated, and contaminated material.

    c. Know what reactor plant reuse water is. Discuss the appropriate uses of reactor plant reuse water.

5. Radiological Casualties:

    a. Discuss the need for consulting radiological controls personnel when questions or problems occur. Understand the importance of complying with the instructions of radiological controls personnel in the event of a problem involving radioactivity.

    b. Discuss procedures to be followed in the event of a spill of material (liquid or solid) which is or might be radioactive.

    c. Discuss procedures to be followed when notified that airborne radioactivity is above the limit.

    d. Discuss procedures to be followed in the event a high radiation area is improperly controlled.

    e. Discuss actions to be taken when an individual discovers his/her pocket dosimeter is off-scale or has recorded a higher reading than expected.

6. Responsibilities of Individuals: Discuss actions required in order to fulfill workers' responsibilities. Discuss the responsibility of the individual to notify his/her employer of medical radiation therapy, medical diagnosis involving radioisotopes, open wounds or lesions, physical conditions which they feel affects their qualification to receive occupational radiation exposure, or occupational radiation exposure from past or current outside employment. Discuss the responsibility of the individual to report to area supervision or radiological controls personnel any

condition that might lead to or cause avoidable exposure to radiation.

7. Practical Ability Demonstrations: These demonstrations are performed on a mock-up.

   a. Demonstrate the ability to read all types of pocket dosimeters used by the organization.

   b. Demonstrate the proper procedure for donning and removing a full set of anticontamination clothing.

   c. Demonstrate the proper procedures for entering and leaving a high radiation area, a radiologically controlled area, and a control point area, including proper procedures for self-monitoring. Demonstrate the ability to read and interpret posted radiation and contamination survey maps.

   d. Demonstrate the ability to properly package and remove an item from a controlled surface contamination area.

   e. Demonstrate action to be taken by one or two workers in the event of a spill of radioactive liquid.

   f. For personnel who will enter or remain in areas where respiratory protection equipment is required, demonstrate the proper procedure for donning and removing the type of respiratory equipment the individual will be required to wear in conjunction with anticontamination clothing. In addition, individuals who are trained to wear air-fed hoods demonstrate the proper response to take if supply air is lost while wearing an air-fed hood.

   g. For personnel who are trained to work in contamination containment areas, demonstrate the proper procedures for working in these areas. This demonstration includes a pre-work inspection, transfer of an item into the area, a work evolution in the area, and transfer of an item out of the area.

In addition to passing a written examination, completion of this training course requires satisfactory performance during basic types of simulated work operations. For an employee to continue as a radiation worker, he has to requalify in a manner similar to the initial qualification at least every two years. In between these qualification periods, personnel are required to be selected at random for additional written and practical work operation examinations to determine how well the knowledge and abilities have been retained. Training is also conducted by individual shop instructors in the specific job skills for radiation work within each trade. For complex jobs this is followed by special training for the specific job, frequently using mock-ups outside radiation areas.

Radiological controls technicians are required to complete a course of six months to one year in length in radiological controls, to demonstrate their practical abilities in work operations and drills, and to pass comprehensive written and oral examinations. Radiological controls supervisors are required to have at least the same technical knowledge and abilities as the technicians; however, passing scores for supervisors' examinations are higher or supervisors' examinations are more difficult than for technicians. Oral examinations are conducted by radiological controls managers and senior supervisors and require personnel to be able to evaluate symptoms of unusual radiological controls situations. The radiological controls technician or supervisor is required to evaluate initial symptoms, state immediate corrective action required, state what additional measurements are required, and do a final analysis of the measurements to identify the specific problem. Subsequent to qualification, periodic training sessions are required in which each radiological controls technician and supervisor demonstrates ability to handle situations such as are used in the oral examinations. At least every two and a half years, radiological controls personnel have to requalify through written and practical abilities examinations similar to those used for initial qualification. Additionally, their first requalification includes an oral examination similar to the one required for initial qualification. Between qualification periods, radiological controls technicians and supervisors are required to be selected at random for additional written and practical abilities examinations. They also must participate in unannounced drills.

In addition to the above training for those who are involved in radioactive work, each shipyard employee not involved in radioactive work and each person assigned to a nuclear-powered ship or a support facility is required to receive basic radiological training which is repeated at least annually. This training is to ensure personnel understand the posting of radiological areas, the identification of radioactive materials, and not to cross radiological barriers. This instruction also explains that the radiation environment of personnel outside radiation areas and outside the ship or shipyard is not significantly affected by nuclear propulsion plant work.

Nuclear Power Training

Military personnel who operate Naval nuclear propulsion plants are required to pass a six month basic training course at Nuclear Power School and a six month qualification course at a land-based prototype of a shipboard reactor plant or moored training ship. Each nuclear-trained officer and enlisted person receives extensive radiological controls training including lectures, demonstrations, practical work, radiological controls drills, and written and oral examinations. This training has emphasized the ability to apply basic information on radiation and radioactivity.

Those enlisted personnel who will have additional responsibilities for radiological controls associated with operation of nuclear propulsion plants are designated Engineering Laboratory Technicians and receive an additional three months training after completion of the one year program. Engineering Laboratory Technicians and other selected nuclear trained personnel who are assigned radiological controls duties at tenders and submarine bases normally receive an additional intensive one month training program in the practical aspects of radiological controls associated with maintenance and repair work.

Prior to becoming qualified as the Engineer Officer, that is, the head of the engineering department of a nuclear-powered ship, a nuclear-trained officer must pass a one day written examination and a sequence of oral examinations conducted at the Naval Nuclear Propulsion Program headquarters. A key part of these qualification examinations is radiological controls.

Immediately before serving as Commanding Officer of a nuclear-powered ship, an officer attends a three month course at the Naval Nuclear Propulsion Program headquarters. The radiological controls portion of this course covers advanced topics and assumes the officer starts with detailed familiarity with shipboard radiological controls. The officer must pass both written and oral examinations in radiological controls during this course prior to assuming command of a nuclear-powered ship.

Radiation Exposure Reduction

Maintaining personnel radiation exposures as low as reasonably achievable involves all levels of management in nuclear-powered ships and their support facilities. Operations, maintenance, and repair personnel are required to be involved in this subject; it is not left solely to radiological controls personnel. To evaluate the effectiveness of radiation exposure reduction programs, managers use a set of goals. Goals are also set in advance to keep each worker's exposure under certain levels and to minimize the number of workers involved. Goals are also set on the total cumulative personnel radiation exposure (man-rem) for each major job, for the entire overhaul or maintenance period, and for the whole year. These goals are deliberately made hard to meet in order to encourage personnel to improve performance.

Of the various goals used, the most effective in reducing personnel radiation exposure has been the use of individual exposure control levels which are lower than the Navy's quarterly and annual limits. Control levels in shipyards range from 0.5

rem to 2 rem for the year, depending on the amount of radioactive work scheduled, whereas 5 rem per year is the annual Navy limit.

To achieve the benefits of lower control levels in reducing total man-rem, it is essential to minimize the number of workers permitted to receive radiation exposure. Otherwise the control levels could be met merely by adding more workers. Organizations are required to conduct periodic reviews to ensure the number of workers is the minimum for the work that has to be performed.

The following is a synopsis of the checklist which has been in use for years in maintaining personnel radiation exposure as low as reasonably achievable during maintenance, overhaul, and repair.

Preliminary Planning

- Plan in advance
- Delete unnecessary work
- Determine expected radiation levels

Preparation of Work Procedures

- Plan access to and exit from work area
- Provide for service lines (air, welding, ventilation, etc.)
- Provide communication (sometimes includes closed-circuit television)
- Remove sources of radiation
- Plan for installation of temporary shielding
- Decontaminate
- Work in lowest radiation levels
- Perform as much work as practicable outside radiation areas
- State requirements for standard tools
- Consider special tools
- Include inspection requirements (these identify steps where radiological controls personnel must sign prior to work proceeding)
- Minimize discomfort of workers
- Estimate man-rem

Temporary Shielding

- Control installation and removal by written procedure
- Inspect after installation
- Conduct periodic radiation surveys
- Minimize damage caused by heavy lead temporary shielding
- Balance radiation exposure received in installation against exposure to be saved by installation
- Shield travel routes

- Shield components with abnormally high radiation levels early in the maintenance period
- Shield position worker occupies
- Perform directional surveys to improve design of shielding by locating sources of radiation
- Use mock-up to plan temporary shielding design and installation

Rehearsing and Briefing

- Rehearse
- Use mock-up duplicating working conditions
- Use photographs
- Brief workers

Performing Work

- Post radiation levels
- Keep excess personnel out of radiation areas
- Minimize beta radiation exposure (anticontamination clothing effectively shields cobalt-60 betas)
- Supervisors and workers keep track of radiation exposure
- Workers assist in radiation and radioactivity measurements
- Evaluate use of fewer workers
- Reevaluate reducing radiation exposures

Since its inception, the Naval Nuclear Propulsion Program has stressed the reduction of personnel radiation exposure. Beginning in the 1960's, a key part of the Program's effort in this area has involved minimizing radioactive corrosion products throughout the reactor plant, which in turn has significantly contributed to reducing personnel radiation exposure. Additional measures that have been taken to reduce exposure include standardization and optimization of procedures, development of new tooling, improved use of temporary shielding, and compliance with strict contamination control measures. For example, most work involving radioactive contamination is performed in containment. This practice minimizes the potential for spreading contamination and thus reduces work disruptions, simplifies working conditions, and minimizes the cost and exposure to clean up.

Lessons learned during radioactive work and new ways to reduce exposure developed at one organization are made available for use by other organizations in the Naval Nuclear Propulsion Program. This effort allows all of the organizations to take advantage of the experience and developments at one organization and minimizes effort.

The extensive efforts that have been taken to reduce exposure in the Naval Nuclear Propulsion Program have also had other benefits, such as reduced cost to perform radioactive work and improved reliability. Efforts such as detailed work planning, rehearsing, total containment, special tools, and standardization have resulted in increased efficiency and better access to perform maintenance with the overall result that reliability is improved and costs are reduced.

Radiation Exposure Data

Radioactive materials had been handled in shipyards for years before Naval nuclear propulsion plant work started. Examples of such work include non-destructive testing using radiography sources and radiation instrument calibration using radioactive sources. Since this work is licensed by the Nuclear Regulatory Commission or by a state under agreement with the Nuclear Regulatory Commission, the radiation exposure from this licensed work has been excluded whenever practicable from this report.

Table 1 shows the dates when radioactive work associated with Naval nuclear propulsion plants started in each of eleven shipyards. Seven of these shipyards have constructed Naval nuclear-powered ships; however, little radiation exposure is received in new construction. The dates of starting reactor plant overhaul, therefore, are the significant dates for start of radioactive work.

The total occupational radiation exposure received by all personnel in the Naval Nuclear Propulsion Program in 1995 was 2,657 man-rem. Table 2 summarizes radiation exposure received in nuclear-powered ships and their supporting tenders and submarine bases since the first nuclear-powered ship went to sea in January 1955. Most of the radiation exposure in this table results from inspection, maintenance and repair work in the reactor compartments of ships. In general, radiation exposures for reactor compartment work increase as reactor plant radiation levels increase with the age of the plant.

Table 3 summarizes radiation exposures of shipyard personnel since the start of Naval nuclear propulsion plant radioactive work in 1954. Figure 2 shows graphically that total personnel radiation exposure has been reduced in shipyards even though the amount of work has increased. Since ship overhauls frequently overlapped calendar years, the numbers of ships in overhaul shown in Figure 2 were determined by dividing by 12 the total number of months each ship was in overhaul during a calendar year. Overhauls include defueling and inactivation of decommissioned ships.

The increase in the numbers of personnel monitored and total man-rem exposure in the early years shows the increasing workload in reactor plant work as the number of ships increased. By 1962, four submarine reactor plants had been overhauled and major efforts were underway to reduce radiation levels. By 1966, the number of ships in overhaul had quadrupled as indicated by the buildup to the peak in total man-rem. Subsequently, the number of ships in overhaul more than quadrupled again. Decreases in total annual exposures, numbers of personnel monitored, and numbers of personnel with annual exposures over 2 rem have been as a result of the program to reduce radiation exposures to the minimum practicable. Since 1954, the total annual exposure for the shipyards has averaged less than 4,800 man-rem and for ships has averaged less than 1,800 man-rem.

Since a worker usually is exposed to radiation in more than one year, the total number of personnel monitored cannot be obtained by adding the annual numbers. The total number of shipyard personnel monitored for radiation exposure associated with the Naval Nuclear Propulsion Program has been about 160,000. Nearly all of these are civilians, about half of whom are U. S. Government employees at six Naval shipyards. Table 4 provides further information about the distribution of their radiation exposures. In 1995, about 96 percent of those monitored for radiation in shipyards and more than 99 percent of those in ships received less than 0.5 rem in a year. The average exposure per year for each person monitored has been 0.25 rem in shipyards and 0.08 rem in ships, which is less than the 0.30 rem average annual exposure a person receives from natural background radiation (ref 11).

Table 4 also lists the numbers of personnel who have exceeded the 3 rem quarterly exposure limit. In no case have personnel exceeded the Federal accumulated limit of 5 rem for each year of age over eighteen. The total number of persons who have exceeded the quarterly limit since the limit was imposed in 1960 is 37, of whom 4 were military personnel aboard ships. Thirty of the 37 personnel had quarterly exposures in the range of 3 to 4 rem, and the highest exposure was 9.7 rem in a quarter. Navy procedures require any person who receives greater than 25 rem in a short time period to be placed under medical observation. None of the exposures reached this level. Furthermore, since 1967 no person has exceeded the Federal limit which allows up to three rem per quarter year, nor in this period has anyone exceeded the Navy's self-imposed limit of 5 rem per year for radiation associated with Naval nuclear propulsion plants.

The average lifetime accumulated exposure from radiation associated with Naval nuclear plants for all shipyard personnel is 1.2 rem. Since the average annual exposure per person is 0.25 rem, this means that the average shipyard radiation worker is monitored because of Naval nuclear propulsion plant work for about five years. The average lifetime accumulated exposure for the 94,000 Naval officers and enlisted men trained to date to operate a nuclear propulsion plant is less than 0.8 rem. These radiation exposures are much less than the exposure the average American receives from natural background radiation or from medical diagnostic x-rays during his working lifetime (ref 11).

TABLE 1

SHIPYARD FIRST REACTOR PLANT OPERATION AND FIRST RADIOACTIVE OVERHAUL WORK

Shipyard	Year First New Construction Reactor Started Operation	Year First Reactor Plant Overhaul Started
Electric Boat Division[1] Groton, Connecticut	1954	1957
Portsmouth Naval Shipyard Portsmouth, New Hampshire	1958	1959
Mare Island Naval Shipyard[2] Vallejo, California	1958	1962
Pearl Harbor Naval Shipyard Pearl Harbor, Hawaii	None	1962
Charleston Naval Shipyard[2] Charleston, South Carolina	None	1963
Newport News Shipbuilding Newport News, Virginia	1960	1964
Bethlehem Steel Shipbuilding[3] (Subsequently Electric Boat Division) Quincy, Massachusetts	1961	None
New York Shipbuilding Corporation[3] Camden, New Jersey	1963	None
Norfolk Naval Shipyard Portsmouth, Virginia	None	1965
Puget Sound Naval Shipyard[2] Bremerton, Washington	None	1967
Ingalls Shipbuilding Division[3] Pascagoula, Mississippi	1961	1970

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[1] Electric Boat Division performed overhauls in 1957 - 1977 but only did new construction work again starting in 1978.

[2] Radioactive work of less extent than an overhaul commenced in Mare Island in 1958, in Charleston in 1961, and in Puget Sound in 1965.

[3] Work on Naval nuclear-powered ships was discontinued at Camden, New Jersey in 1967, at Quincy, Massachusetts in 1969, and at Pascagoula, Mississippi in 1980.

TABLE 2

OCCUPATIONAL RADIATION EXPOSURE RECEIVED BY PERSONNEL ASSIGNED TO TENDERS, BASES, AND NUCLEAR-POWERED SHIPS FROM OPERATION AND MAINTENANCE OF NAVAL NUCLEAR PROPULSION PLANTS

	Number of Persons Monitored Who Received Exposures in the Following Ranges of Rem for the Year						Total Personnel Monitored	Total Man-Rem
Year	0-1	1-2	2-3	3-4	4-5	>5*		
1954	36	0	0	0	0	0	36	8
1955	90	11	0	0	0	0	101	25
1956	108	10	4	0	0	0	122	50
1957	293	7	1	0	0	0	301	60
1958	562	11	3	0	0	0	576	100
1959	1,057	41	8	3	0	0	1,109	200
1960	2,607	88	8	4	3	1	2,711	375
1961	4,812	106	31	4	4	0	4,957	680
1962	6,788	182	75	31	17	2	7,095	1,312
1963	9,188	197	39	14	3	1	9,442	1,420
1964	10,317	331	93	35	15	14	10,805	1,964
1965	11,883	592	224	96	30	27	12,852	3,421
1966	18,118	541	156	95	44	28	18,982	3,529
1967	21,028	339	139	48	11	0	21,565	3,084
1968	24,200	373	103	20	2	0	24,698	2,463
1969	26,969	577	127	39	6	0	27,718	2,918
1970	26,206	610	134	30	0	0	26,980	3,089
1971	26,090	568	122	31	2	0	26,813	3,261
1972	33,312	602	180	13	1	0	34,108	3,271
1973	30,852	600	102	15	1	0	31,570	3,160
1974	18,375	307	65	2	0	0	18,749	2,142
1975	17,638	330	28	1	0	0	17,997	2,217
1976	17,795	369	56	9	0	0	18,229	2,642
1977	20,236	346	95	36	3	0	20,716	2,812
1978	22,089	290	23	1	0	0	22,403	2,234
1979	21,121	75	1	0	0	0	21,197	1,528
1980	21,767	78	0	0	0	0	21,845	1,494
1981	23,781	27	0	0	0	0	23,808	1,415
1982	27,563	59	0	0	0	0	27,622	1,660
1983	27,593	52	0	0	0	0	27,645	1,832
1984	30,096	10	0	0	0	0	30,106	1,729
1985	31,447	18	0	0	0	0	31,465	1,549
1986	33,944	16	0	0	0	0	33,960	1,593
1987	34,987	2	0	0	0	0	34,899	1,536
1988	34,782	4	0	0	0	0	34,786	1,422
1989	35,116	52	0	0	0	0	35,168	1,599
1990	36,036	15	0	0	0	0	36,051	1,501
1991	35,669	0	0	0	0	0	35,669	1,332
1992	34,940	2	0	0	0	0	34,942	1,460
1993	32,521	3	0	0	0	0	32,524	1,452
1994	30,646	0	0	0	0	0	30,646	1,214
1995	28,833	0	0	0	0	0	28,833	1,302

Note: Data obtained from summaries rather than directly from original medical records. Total man-rem was determined by adding actual exposures for each individual monitored by each reporting command during the year. Total number monitored includes visitors to each reporting command. It is expected that the large effort to compile comparable man-rem data from original medical records would show differences no greater than five percent.

* Limit in the Naval Nuclear Propulsion Program was changed to 5 rem per year in 1967.

TABLE 3

OCCUPATIONAL RADIATION EXPOSURE RECEIVED BY SHIPYARD PERSONNEL FROM WORK ASSOCIATED WITH NAVAL NUCLEAR PROPULSION PLANTS

Year	Number of Persons Monitored Who Received Exposures in the Following Ranges of Rem for the Year						Total Personnel Monitored	Total Man-Rem
	0-1	1-2	2-3	3-4	4-5	>5*		
1954	508	9	3	5	3	0	528	64
1955	2,563	80	25	6	3	2	2,679	344
1956	2,834	20	5	2	0	1	2,862	162
1957	3,473	97	31	1	2	4	3,608	495
1958	5,766	165	46	10	4	7	5,998	779
1959	10,388	221	133	78	49	23	10,892	1,864
1960	12,047	198	97	22	4	0	12,368	1,158
1961	13,383	198	91	44	14	3	13,733	1,241
1962	14,411	642	366	247	146	108	15,920	5,222
1963	19,164	446	159	71	34	28	19,902	2,725
1964	24,044	804	445	215	144	41	25,693	5,678
1965	22,630	2,306	1,314	814	618	525	28,207	15,829
1966	29,490	2,352	1,623	1,057	1,139	513	36,174	18,804
1967	29,853	2,388	1,563	1,096	733	1	35,634	13,908
1968	30,159	1,344	773	496	279	0	33,051	8,719
1969	25,672	1,790	1,080	753	375	0	29,670	11,077
1970	21,182	2,127	1,382	740	492	0	25,923	13,084
1971	20,041	1,928	1,066	650	240	0	23,925	10,616
1972	17,514	1,692	849	139	5	0	20,199	7,002
1973	13,036	1,403	604	203	6	0	15,252	6,083
1974	12,587	1,464	745	311	50	0	15,157	7,206
1975	12,825	1,116	598	82	42	0	14,663	5,285
1976	13,042	1,268	633	30	0	0	14,973	5,310
1977	13,835	1,277	586	25	0	0	15,723	5,199
1978	13,700	1,016	268	0	0	0	14,984	3,680
1979	15,032	227	7	0	0	0	15,266	2,024
1980	15,287	377	0	0	0	0	15,664	2,402
1981	17,414	304	0	0	0	0	17,718	2,310
1982	19,210	648	0	0	0	0	19,858	3,353
1983	20,407	714	0	0	0	0	21,121	3,506
1984	20,684	502	0	0	0	0	21,186	3,181
1985	20,940	412	0	0	0	0	21,352	2,796
1986	21,186	875	0	0	0	0	22,061	3,495
1987	21,404	788	0	0	0	0	22,192	3,187
1988	20,969	543	0	0	0	0	21,512	2,702
1989	23,789	633	0	0	0	0	24,422	2,941
1990	25,077	501	0	0	0	0	25,578	2,812
1991	24,873	492	0	0	0	0	25,365	2,866
1992	24,703	440	0	0	0	0	25,143	2,936
1993	23,542	572	0	0	0	0	24,114	2,913
1994	18,912	362	0	0	0	0	19,274	1,890
1995	16,422	212	0	0	0	0	16,634	1,355

Note: Data obtained from summaries rather than directly from original medical records. Total man-rem was determined by adding actual exposures for each individual monitored by each shipyard during the year. Total number monitored includes visitors to each shipyard. It is expected that the large effort to compile comparable man-rem data from original medical records would show differences no greater than five percent.

* Limit in the Naval Nuclear Propulsion Program was changed to 5 rem per year in 1967.

FIGURE 2
TOTAL RADIATION EXPOSURE RECEIVED BY SHIPYARD PERSONNEL FROM WORK ON NAVAL NUCLEAR PROPULSION PLANTS 1958 - 1995

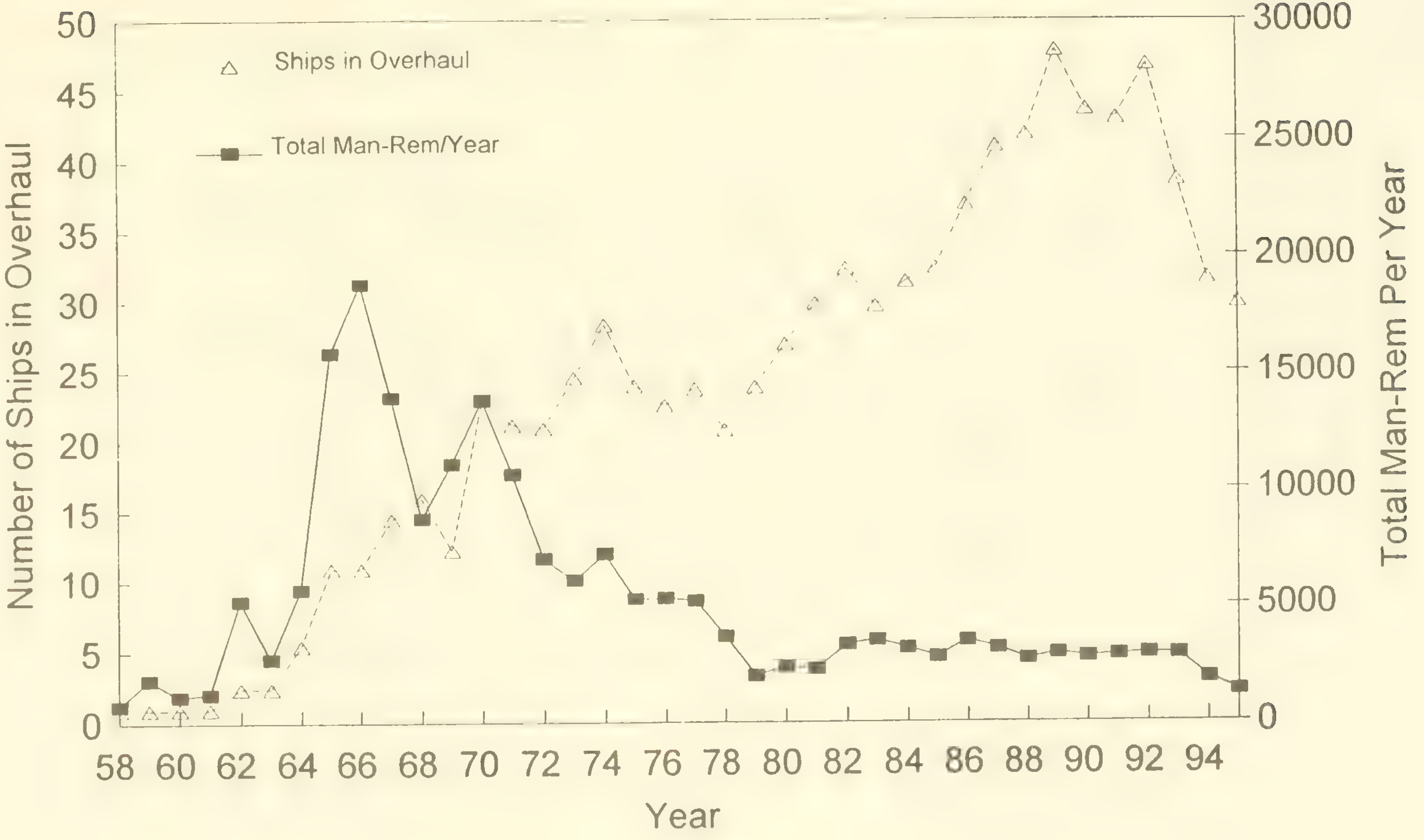

TABLE 4

SHIPYARD AND FLEET DISTRIBUTION OF PERSONNEL RADIATION EXPOSURE

Year	Average Rem Per Person Monitored		Percent of Personnel Monitored Who Received Greater Than 1 Rem		Number of Personnel Who Exceeded 3 Rem/Quarter
	Fleet	Shipyard	Fleet	Shipyard	
1954	.22	.12	0	3.8	0
1955	.25	.13	10.9	4.3	0
1956	.41	.06	11.5	1.0	0
1957	.20	.14	2.7	3.7	0
1958	.17	.13	2.4	3.9	0
1959	.18	.17	4.7	4.6	8
1960	.14	.09	7.5	2.6	0
1961	.14	.09	2.9	2.5	0
1962	.18	.33	4.3	9.5	9
1963	.15	.13	2.7	3.7	2
1964	.18	.22	4.5	6.4	4
1965	.27	.56	7.5	19.8	5
1966	.19	.52	4.6	18.5	6
1967	.14	.39	2.5	16.2	3
1968	.10	.26	2.0	8.8	0
1969	.11	.37	2.7	13.5	0
1970	.11	.50	2.9	18.3	0
1971	.12	.44	2.7	16.2	0
1972	.10	.35	2.3	13.3	0
1973	.10	.40	2.3	14.5	0
1974	.11	.48	2.0	17.0	0
1975	.12	.36	2.0	12.5	0
1976	.14	.35	2.4	12.9	0
1977	.14	.33	2.3	12.0	0
1978	.10	.24	1.4	8.5	0
1979	.07	.13	0.4	1.5	0
1980	.07	.15	0.4	2.4	0
1981	.06	.13	0.1	1.7	0
1982	.06	.17	0.2	3.3	0
1983	.07	.17	0.2	3.4	0
1984	.06	.15	0.0	2.4	0
1985	.05	.13	0.1	1.9	0
1986	.05	.16	0.0	4.0	0
1987	.04	.14	0.0	3.6	0
1988	.04	.13	0.0	2.5	0
1989	.05	.12	0.1	2.6	0
1990	.04	.11	0.0	2.0	0
1991	.04	.11	0.0	1.9	0
1992	.04	.12	0.0	1.8	0
1993	.04	.12	0.0	2.4	0
1994	.04	.10	0.0	1.9	0
1995	.05	.08	0.0	1.3	0
Average	.08	.25	1.2	8.0	
NAVYWIDE AVERAGE	0.16		4.3		

Table 5 provides information on the distribution of lifetime accumulated exposures for all personnel who were monitored in 1995 for radiation exposure associated with Naval nuclear propulsion plants. The 5 rem annual Federal radiation exposure limit would allow accumulating 100 rem in twenty years of work, or 200 rem in forty years. The fact that no one shown in Table 5 comes close to having accumulated this much radiation exposure is the result of deliberate efforts to keep lifetime radiation exposures low.

TABLE 5

DISTRIBUTION OF TOTAL LIFETIME RADIATION EXPOSURE ASSOCIATED WITH NAVAL NUCLEAR PROPULSION PLANTS

RANGE OF ACCUMULATED LIFETIME RADIATION EXPOSURES (REM)	PERCENTAGE OF PERSONNEL MONITORED IN 1995 WITH LIFETIME ACCUMULATED RADIATION EXPOSURE WITHIN THAT RANGE	
	FLEET	SHIPYARDS
0 - 5	99.81	87.22
5 - 10	0.18	8.92
10 - 15	<0.02	2.38
15 - 20	0	0.86
20 - 25	0	0.38
25 - 30	0	0.17
30 - 50	0	0.07
Greater than 50	0	0.0

The radiation exposure limits used in the U. S. until the recent change to the Code of Federal Regulations, Title 10, Part 20 limited an individual's lifetime exposure to 5 rem for each year beyond age eighteen. With the recent change, lifetime exposure is not specifically limited, but is controlled as the result of the annual limit of 5 rem. In their most recent radiation protection recommendations, the National Council on Radiation Protection and Measurements (NCRP) encourages organizations to control lifetime accumulated exposure to less than 1 rem times the person's age (ref 12). Among all personnel monitored in 1995, there is currently no worker with a lifetime accumulated exposure greater than the NCRP recommended level of 1 rem times their age from radiation associated with Naval nuclear propulsion plants.

Table 6 provides a basis for comparison between the radiation exposure for light water reactors operated by the Navy and commercial nuclear-powered reactors licensed by the Nuclear Regulatory Commission. The 1994 data in this Nuclear Regulatory Commission table covers 109 licensed commercial nuclear-powered reactors with a total of 21,534 man-rem (ref 13). The 1994 average annual exposure of each worker at commercial nuclear-powered reactors was 0.15 rem.[4] Licensees of commercial nuclear-powered reactors reported 279 overexposures to external radiation during the years 1971 through 1994. Numbers in excess of 5 rem are not necessarily overexposures since prior to January 1, 1994, Nuclear Regulatory Commission regulations permitted exposures of 3 rem each quarter up to 12 rem per year within the accumulated total limit of 5 rem for each year of a person's age beyond eighteen.

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[4] This average was calculated by dividing total man-rem by total number of workers monitored as is done in Table 4. Reference 13 reports this value as 0.26 rem; however, it is calculated by dividing the total man-rem by the number of workers with measurable exposure (not adjusted for multiple reporting of transient individuals).

TABLE 6

PERSONNEL
RADIATION EXPOSURE FOR COMMERCIAL NUCLEAR-POWERED REACTORS LICENSED BY U S NUCLEAR REGULATORY COMMISSION (REF 13)

SUMMARY OF ANNUAL WHOLE BODY EXPOSURE BY INCREMENT

			NUMBER OF INDIVIDUALS												
			EXPOSURE INCREMENT - REM												
YEAR	TOTAL MONITORED	NOT MEASURABLE	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	>10	TOTAL MAN-REM	NUMBER OF OVER-EXPOSURES
1971	9,581		8,996		315	137	105	17	11	0	0	0	0		2
1972	15,713		14,783		532	199	111	46	21	9	6	6	0		16
1973	33,823	19,043	9,798	2,468	1,584	422	251	125	71	38	16	7	0	13,963	19
1974	38,938	20,472	13,766	2,503	1,378	471	226	86	30	6	0	0	0	13,722	43
1975	44,343	18,854	18,289	3,948	1,872	691	423	169	69	24	12	0	1	20,879	14
1976	61,151	25,704	26,636	4,880	2,354	789	487	188	70	26	11	5	1	26,433	20
1977	62,420	23,562	28 053	5,649	2,856	1,288	661	186	89	47	23	6	0	32,508	27
1978	71,046	28,372	31,776	5,995	3,034	1,197	514	109	37	9	0	1	2	31,801	9
1979	103,449	43,330	47,018	7,572	3,404	1,400	545	117	42	17	3	0	0	39,982	23
1980	125,376	50,873	56,187	10,671	4,607	1,816	831	235	119	29	7	1	0	53,795	73
1981	115,919	39,265	57,931	11,170	4,811	1,999	533	103	93	9	3	1	1	54,144	7
1982	120,936	41,713	61,490	10,220	4,716	2,066	596	97	31	5	0	1	1	52,190	2
1983	126,652	47,048	59,773	11,345	5,332	2,269	716	121	38	8	2	0	0	56,472	8
1984	144,980	54,670	71,138	11,283	5,206	2,122	487	52	22	0	0	0	0	55,235	3
1985	146,462	59,634	72,054	10,040	3,575	1,001	157	1	0	0	0	0	0	43,042	3
1986	161,606	67,701	79,588	10,241	3,062	868	146	0	0	0	0	0	0	42,381	1
1987	181,343	85,181	82,813	10,611	2,192	477	69	0	0	0	0	0	0	40,401	1
1988	183,199	87,254	82,655	10,310	2,422	511	26	0	1	0	0	0	0	40,769	6
1989	184,007	83,947	89,408	8,634	1,614	370	34	0	0	0	0	0	0	35,939	1
1990	182,431	83,873	87,814	8,594	1,794	335	21	0	0	0	0	0	0	36,592	0
1991	178,315	87,250	83,916	5,975	938	219	17	0	0	0	0	0	0	28,527	0
1992	181,877	87,717	87,187	6,076	808	85	4	0	0	0	0	0	0	29,294	1
1993	169,260	83,069	80,150	5,322	638	76	5	0	0	0	0	0	0	26,363	0
1994	141,901	68,742	68,649	4,075	415	20	0	0	0	0	0	0	0	21,534	0

Figures shown for the years 1977-1994 have been adjusted by the NRC for the multiple reporting of transient individuals

INTERNAL RADIOACTIVITY

Policy and Limits

The Navy's policy on internal radioactivity for personnel associated with the nuclear propulsion program continues to be the same as it was more than three decades ago--to prevent significant radiation exposure to personnel from internal radioactivity. The limits invoked to achieve this objective are one-tenth of the levels allowed by Federal regulations for radiation workers. The results of this program have been that no one has received more than one-tenth the Federal annual internal occupational exposure limits from internal radiation exposure caused by radioactivity associated with Naval nuclear propulsion plants.

The basic Federal limit for radiation exposure to organs of the body from internal radioactivity has been 15 rem per year. There have been higher levels applied at various times for thyroid and for bones; however, use of these specific higher limits has not been necessary in the Naval Nuclear Propulsion Program.

Fifteen rem per year was the limit recommended for most organs of the body by the U. S. National Committee on Radiation Protection and Measurements in 1954 (ref 1), by the U. S. Atomic Energy Commission in the initial edition of reference (3) applicable in 1957, by the International Commission on Radiological Protection in 1959 (ref 2), and was adopted for Federal agencies when President Eisenhower approved recommendations of the Federal Radiation Council May 13, 1960.

In 1977 the International Commission on Radiological Protection revised its recommendations (ref 8), particularly regarding internal exposure. The new recommendations provided a method of combining, and controlling, exposure from internal radioactivity with exposure from external radiation. The effect of the 1977 recommendations was to raise the allowable dose to many organs, with no organ allowed to receive more than 50 rem in a year. In conjunction with these recommendations, more recent knowledge on the behavior and effect of internal radioactivity was used to derive new limits for control of internal radioactivity (ref 14). The Federal guidance approved by the President in 1987 adopted these revised recommendations and methods. As discussed below, cobalt-60 is the radionuclide of most concern for internal radioactivity in the Naval Nuclear Propulsion Program. The derived concentration limits for cobalt-60 established at the inception of the Program, which control exposure to below one-tenth the Federal annual internal occupational exposure limit, remain unchanged under the new recommendations and methodology.

Source of Radioactivity

Radioactivity can get inside the body through air, through water or food, and through surface contamination via the mouth, skin, or a wound. The radioactivity of primary concern is the activated metallic corrosion products on the inside surfaces of reactor plant piping systems. These are in the form of insoluble metallic oxides, primarily iron oxides. Reference 15 contains more details on why cobalt-60 is the radionuclide of most concern for internal radioactivity.

The design conditions for reactor fuel are much more severe for warships than for commercial power reactors. As a result of being designed to withstand shock, Naval reactor fuel elements retain fission products including fission gases within the fuel. Sensitive measurements are made frequently to verify the integrity of reactor fuel. Consequently, fission products such as strontium-90 and cesium-137 make no measurable contribution to internal exposure of personnel from radioactivity associated with Naval nuclear propulsion plants. Similarly, alpha emitters such as uranium and plutonium are retained within the fuel elements and are not accessible to personnel operating or maintaining a Naval nuclear propulsion plant.

Because of the high integrity of reactor fuel and because soluble boron is not used in reactor coolant for normal reactivity control in Naval reactors, the amounts of tritium in reactor coolant are far less than in typical commercial power reactors. The small amounts that are present are formed primarily as a result of neutron interaction with the deuterium naturally present in water. The radiation from tritium is of such low energy that the Federal limits for breathing or swallowing tritium are more than three hundred times higher than for cobalt-60. As a result, radiation exposure to personnel from tritium is far too low to measure. Similarly, the low energy beta radiation from carbon-14, which is formed in small quantities in reactor coolant systems as a result of neutron interactions with nitrogen and oxygen, does not add measurable radiation exposure to personnel operating or maintaining Naval nuclear propulsion plants.

Control of Airborne Radioactivity

Airborne radioactivity is controlled in maintenance operations such that respiratory equipment is not normally required. To prevent exposure of personnel to airborne radioactivity when work might expose radioactivity to the atmosphere, contamination containment tents or bags are used. These containments are ventilated to the atmosphere through high efficiency filters which have been tested to remove at least 99.95 percent of particles of a size comparable to cigarette smoke. Radiologically controlled areas such as reactor compartments are also required to be ventilated through high efficiency filters any time work which could cause airborne radioactivity is in progress. Airborne radioactivity surveys are required to be performed regularly in radioactive work areas. Any time airborne radioactivity above the limit is detected in occupied areas, work which might be causing airborne radioactivity is stopped. This conservative action is taken to minimize internal radioactivity even though the Naval Nuclear Propulsion Program's airborne radioactivity limit would allow continuous breathing for forty hours per week throughout the year to reach an annual exposure to the lungs of one-tenth the Federal limit. Personnel are also trained to use respiratory equipment when airborne radioactivity above the limit is detected. However, respiratory equipment is seldom needed and is not relied upon as the first line of defense against airborne radioactivity.

It is not uncommon for airborne radioactivity to be caused by radon naturally present in the air. Atmospheric temperature inversion conditions can allow this buildup of radioactive particles from radon. Radon can also build up in sealed or poorly ventilated rooms in homes or buildings made of stone or concrete, or it can migrate from the supporting ground. Most cases of airborne radioactivity above the Naval Nuclear Propulsion Program's conservative airborne radioactivity limit in occupied areas have been caused by radioactive particles from radon and not from the reactor plant. Procedures have been developed to reduce the radon levels when necessary and allow work to continue after it has been determined that the elevated airborne radioactivity is from naturally occurring radon.

Radon is also emitted from radium used for making dials luminous. There have been a number of cases where a single radium dial such as on a wristwatch has caused the entire atmosphere of a submarine to exceed the airborne radioactivity limit used for the nuclear propulsion plant. Radium in any form has been banned from submarines to prevent interference with keeping airborne radioactivity from the nuclear propulsion plant as low as practicable.

Control of Radioactive Surface Contamination

Perhaps the most restrictive regulations in the Naval Nuclear Propulsion Program's radiological controls program are established in the requirements for the control of radioactive contamination. Work operations involving potential for spreading radioactive contamination use containments to prevent personnel from becoming contaminated. The controls for radioactive contamination are so strict that precautions sometimes have had to be taken to prevent tracking contamination from fallout and natural sources into nuclear areas because the contamination control limits used in the nuclear areas were below the levels of fallout and natural contamination occurring outside in the general public areas.

Anticontamination clothing, including coveralls, hood (to cover the head, ears and neck), shoe covers and gloves, is provided when needed. However, the basic approach is to avoid the need for anticontamination clothing by containing the radioactivity.

As a result, most work on radioactive materials is performed with hands reaching into gloves installed in containments, making it unnecessary for the worker to wear anticontamination clothing. In addition to providing better control over the spread of radioactivity, this method has reduced radiation exposure since the worker can usually do his job better and faster in his normal work clothing. A basic requirement of contamination control is monitoring all personnel leaving any area where radioactive contamination could possibly occur. Workers are trained to survey themselves (i.e., frisk), and their performance is checked by radiological controls personnel. Frisking of the entire body is required, normally using sensitive hand-held survey instruments. Major work facilities are equipped with portal monitors, which are used in lieu of hand-held friskers. Personnel monitor before, not after, they wash. Therefore, washing or showering at the exit of radioactive work areas is not required. The basic philosophy is to prevent contamination, not wash it away.

Surveys for radioactive contamination are taken frequently by trained radiological controls personnel. Results of these surveys are reviewed by supervisory personnel to provide a double-check that no abnormal conditions exist. The instruments used for these surveys are checked against a radioactive calibration source daily and prior to use, and they are calibrated at least every six months.

Control of Food and Water

Smoking, eating, drinking and chewing are prohibited in radioactive areas. Aboard ship, drinking water is distilled from seawater by using steam. However, the steam is not radioactive because it is in a secondary piping system separate from the reactor plant radioactive water. In the event radioactivity were to leak into the steam system, sensitive radioactivity detection instruments which operate continuously would give early warning.

Wounds

Skin conditions or open wounds which might not readily be decontaminated are cause for temporary or permanent disqualification from doing radioactive work. Workers are trained to report such conditions to radiological controls or medical personnel, and radiological controls technicians watch for open wounds when workers enter radioactive work areas. In the initial medical examination prior to radiation work and during subsequent examinations, skin conditions are also checked. If the cognizant local medical officer determines a wound is sufficiently healed or considers the wound adequately protected, he may remove the temporary disqualification.

There have been only a few cases of contaminated wounds in the Naval Nuclear Propulsion Program. In most years, none occurred. Examples of such injuries which have occurred in the past include a scratched hand, a metallic sliver in a hand, a cut finger, and a puncture wound to a hand. These wounds occurred at the same time the person became contaminated. Insoluble metallic oxides which make up the radioactive contamination remain primarily at the wound rather than being absorbed into the blood stream. These radioactively contaminated wounds have been easily decontaminated. No case of a contaminated wound is known where the radioactivity present in the wound was as much as one one-thousandth of that permitted for a radiation worker to have in his body.

Monitoring for Internal Radioactivity

The radioactivity of most concern for internal radiation exposure from Naval nuclear propulsion plants is cobalt-60. Although most radiation exposure from cobalt-60 inside the body will be from beta radiation, the gamma radiation given off makes cobalt-60 easy to detect. Complex whole body counters are not required to detect cobalt-60 at low levels inside the body. For example, one-millionth of a curie of cobalt-60 inside the lungs or intestines will cause a measurement of two times above the background reading with the standard hand-held survey instrument used for personnel frisking. This amount of internal radioactivity will cause the instrument to reach the alarm level. Every person is required to monitor the entire body upon leaving an area with radioactive surface contamination. Monitoring the entire body is a requirement in the Naval Nuclear Propulsion Program; monitoring just hands and feet is not permitted. Therefore, if a person had as little as one-millionth of a curie of cobalt-60 internally, it would readily be detected.

Swallowing one-millionth of a curie of cobalt-60 will cause internal radiation exposure of about 0.08 rem. The radioactivity will pass through the body and be excreted within a period of a little more than one day.

One-millionth of a curie of cobalt-60 still remaining in the lungs one day after an inhalation incident is estimated to cause a radiation exposure of about 2 rem to the lungs over the following year and 6 rem total over a lifetime based on standard calculative techniques recommended by the International Commission on Radiological Protection (ref 14). These techniques provide a convenient way to estimate the amount of radiation exposure a typical individual might be expected to receive from small amounts of internally deposited radioactivity. These techniques account for the gradual removal of cobalt-60 from the lungs through biological processes and the radioactive decay of cobalt-60 with a 5.3 year half life. However, if an actual case were to occur, the measured biological elimination rate would be used in determining the amount of radiation exposure received.

In addition to the control measures to prevent internal radioactivity and the frisking frequently performed by those who work with radioactive materials, more sensitive internal monitoring is also performed. Procedures designed specifically for monitoring internal radioactivity use a type of gamma radiation sensitive scintillation detector which will reliably detect an amount of cobalt-60 inside the body that is more than one hundred times lower than the one-millionth of a curie used in the examples above. Shipyards typically monitor each employee for internal radioactivity as part of each radiation medical examination, which is performed before initially performing radiation work, after terminating radiation work, and periodically in between. Tenders, bases, and nuclear-powered ships require personnel to be internally monitored before initially assuming duties involving radiation exposure and upon terminating from such duties.

Shipyards, tenders, and bases also monitor periodically during the year groups of personnel who did the work most likely to have caused spread of radioactive contamination. Any person, whether at a shipyard, tender, base or aboard a nuclear-powered ship, who has radioactive contamination above the limit anywhere on the skin of his body during regular monitoring at the exit from a radioactive area is monitored for internal radioactivity with the sensitive detector. Also any person who might have breathed airborne radioactivity above limits is monitored with the sensitive detector.

Internal monitoring equipment is calibrated each work shift the equipment is in use. This calibration involves checking the equipment's response to a known source of radiation. In addition, the Navy has an independent quality assurance program in which organizations performing internal monitoring are tested on a periodic basis. This testing involves monitoring a human-equivalent torso phantom, which contains an amount of radioactivity traceable to standards maintained by the National Institute of Standards and Technology. The exact amount of radioactivity in the test phantom is not divulged to the organization being tested until after the test is complete. Any inaccuracies found by these tests that exceed established permissible error limits are investigated and corrected.

Results of Internal Monitoring in 1995

During 1995, approximately 11,000 personnel were monitored for internally deposited radioactivity using sensitive scintillation detectors at the eight shipyards performing work associated with Naval nuclear propulsion plants. Equipment and procedures provide detection of at least 0.01 millionths of a curie of cobalt-60.

No personnel monitored during 1995 had internal radioactivity above this level.

EFFECTS OF RADIATION ON PERSONNEL

Control of radiation exposure in the Naval Nuclear Propulsion Program has always been based on the assumption that any exposure, no matter how small, involves some risk; however, exposure within the accepted exposure limits represents a risk small compared with normal hazards of life. The basis for this statement is presented below.

Exposure to Radiation May Involve Some Risk

Since the inception of nuclear power, scientists have cautioned that exposure to ionizing radiation in addition to that from natural background may involve some risk. The National Committee on Radiation Protection and Measurements in 1954 (ref 1) and the International Commission on Radiological Protection in 1958 (ref 2) both recommended that exposures should be kept as low as practicable and that unnecessary exposure should be avoided to minimize this risk. The International Commission on Radiological Protection in 1962 (ref 16) explained the assumed risk as follows:

> "The basis of the Commission's recommendations is that any exposure to radiation may carry some risk. The assumption has been made that, down to the lowest levels of dose, the risk of inducing disease or disability in an individual increases with the dose accumulated by the individual, but is small even at the maximum permissible levels recommended for occupational exposure."

The National Academy of Sciences-National Research Council Advisory Committee on the Biological Effects of Atomic Radiation included similar statements in its reports in the 1956-1961 period and most recently in 1990 (ref 17). In 1960, the Federal Radiation Council stated (ref 4) that its radiation protection guidance did not differ substantially from recommendations of the National Committee on Radiation Protection and Measurements, the International Commission on Radiological Protection, and the National Academy of Sciences. This statement was again reaffirmed in 1987 (ref 9).

One conclusion from these reports is that radiation exposures to personnel should be minimized. This is not a new conclusion. It has been a major driving force of the Naval Nuclear Propulsion Program.

Radiation Exposure Comparisons

The success of the Naval Nuclear Propulsion Program in minimizing exposures to personnel can be evaluated by making some radiation exposure comparisons.

Annual Exposure

One important measure of personnel exposure is the amount of exposure an individual receives in a year. Tables 2 and 3 show that since 1980, no individual has exceeded 2 rem in a year while working in the Naval Nuclear Propulsion Program. Also, from Table 4 it can be seen that the average exposure per person monitored has remained essentially constant since 1980 at approximately 0.05 rem for Fleet personnel and 0.13 rem for Shipyard personnel. The following comparisons give perspective on these individual annual doses in comparison to Federal limits and other exposures:

- The maximum individual annual dose of 2 rem is less than the Federally allowed individual quarterly dose of 3 rem.

- The maximum individual annual dose of 2 rem is less than one-half the Federal annual limit of 5 rem.

- Although no person in the Naval Nuclear Propulsion Program has exceeded 2 rem in a year since 1980, annually between 400 and 7000 workers at NRC-licensed commercial nuclear-powered reactors have exceeded 2 rem in various years over this same period (ref 13).

- The average annual exposure of 0.05 rem for Fleet personnel is:
    - one hundredth the Federal annual limit of 5 rem.
    - approximately one third the average annual exposure of commercial nuclear power plant personnel (ref 13).
    - approximately one third the average annual exposure received by U. S. commercial airline flight crew personnel due to cosmic radiation (ref 18).

- The average annual exposure of 0.13 rem for Shipyard personnel is:
    - approximately one fortieth of the Federal annual limit of 5 rem.
    - less than the average annual exposure of commercial nuclear power plant personnel (ref 13).
    - less than the average annual exposure received by U. S. commercial airline flight crew personnel due to cosmic radiation (ref 18).

For additional perspective, the annual exposures for personnel in the Naval Nuclear Propulsion Program may also be compared to natural background and medical exposures:

o The maximum annual exposure of 2 rem is less than half the annual exposure from natural radioactivity in the soils in some places in the world, such as Tamil Nadu, India and Meaipe, Brazil (ref 19).

o The average annual exposure of 0.05 rem for Fleet personnel is:

- less than one fifth the average annual exposure to a member of the population in the U. S. from natural background radiation (ref 20).
- slightly less than the difference in the annual exposure due to natural background radiation between Denver, Colorado and Washington, D.C. (ref 20).

o Fleet personnel operating nuclear-powered submarines receive less total annual exposure than they would if they were stationed on shore performing work not involving occupational radiation exposure. This exposure is less, because of the low natural background radiation in a steel hull submerged in the ocean compared to the natural background radiation from cosmic, terrestrial, and radon sources on shore and the effectiveness of the shielding aboard ship.

o The average annual exposure of 0.13 rem for Shipyard personnel is:

- less than one half the average annual exposure to a member of the population in the U. S. from natural background radiation (ref 20).
- approximately equal to the exposure from common diagnostic medical x-ray procedures such as x-rays of the back (ref 21).

Collective Dose

The sum of all individual exposures gives the collective dose. Collective dose is used as a measure of the theoretical effect on the personnel occupationally exposed from the Naval Nuclear Propulsion Program taken as a group, and is an indicator of the effectiveness of the Program's efforts to minimize radiation exposure. From Tables 2 and 3, it can be seen that the collective dose received by all personnel in the Naval Nuclear Propulsion Program in 1995 was 2,657 man-rem. The following comparisons give perspective on this collective dose in comparison to collective doses from other occupations. This annual collective dose is:

o Slightly more than one third the average annual collective dose to a comparable number of commercial nuclear power plant personnel (ref 13).

- Less than the average annual collective dose to a comparable number of persons in the medical field (ref 18).

- Slightly more than one third the average annual collective dose to a comparable number of commercial airline flight crew personnel (ref 18).

For even further perspective, the annual collective dose to personnel in the Naval Nuclear Propulsion Program may also be compared to collective doses from radiation exposures not related to an individual's occupation. This annual collective dose is:

- Less than one fifth the average annual collective dose of 14,000 man-rem to a comparable number of individuals in the U. S. population due to natural background radiation (ref 11).

- Approximately half the average annual collective dose of 5,700 man-rem to a comparable number of individuals in the U. S. population from diagnostic medical procedures such as x-rays of the back (ref 21).

- Less than one twentieth the average annual collective dose of 59,000 man-rem to a comparable number of individuals in the U. S. population due to the natural radioactivity in tobacco smoke (ref 11) (rough comparison due to difficulty in estimating effective dose from smoking).

Conclusions on Radiation Exposure to Personnel

From the preceding comparisons, it is concluded that occupational exposures to individuals working in the Naval Nuclear Propulsion Program are small when compared to occupational exposures and limits and are within the range of exposures from natural background radiation in the U. S. and in the world. Additionally, the total dose to all persons (collective dose) each year is small compared to the collective doses to workers in other occupations, and insignificant compared to the collective doses to the U. S. population from natural background radiation, medical procedures, and tobacco smoke. In reference 18 the National Council on Radiation Protection and Measurements reviewed the exposures to the U. S. working population from occupational exposures. This included a review of the occupational exposures to personnel from the Naval Nuclear Propulsion Program. Based on this review, the National Council on Radiation Protection and Measurements concluded:

> "These small values (of occupational exposure) reflect the success of the Navy's efforts to keep doses as low as reasonably achievable (ALARA)."

Studies of the Effects of Radiation on Humans

Observations on the biological effects of ionizing radiation began to be made soon after the discovery of x-rays in 1895 (ref 17).

Numerous references are made in the early literature concerning the potential biological effects of exposure to ionizing radiation. These effects have been intensively investigated for many years (ref 22). Although there still exists some uncertainty about the exact level of risk, the National Academy of Sciences has stated: "It is fair to say that we have more scientific evidence on the hazards of ionizing radiation than on most, if not all, other environmental agents that affect the general public" (ref 23). A large amount of experimental evidence of radiation effects on living systems has come from laboratory studies on cell systems and on animals. However, what sets our extensive knowledge of radiation effects on humans apart from other hazards is the evidence that has been obtained from studies of human populations that have been exposed to radiation in various ways (ref 23). The health effects demonstrated from studies of people exposed to high doses of radiation (that is, significantly higher than current occupational limits) include the induction of cancer, cataracts, sterility, and developmental abnormalities from prenatal exposure. Animal studies have documented the potential for genetic effects.

Near the end of 1993, the Secretary of Energy requested the disclosure of all records and information on radiation experiments involving human subjects performed or supported by Department of Energy or predecessor agencies. The Naval Nuclear Propulsion Program has never conducted or supported any radiation experiments on humans. As discussed in this report, the Program has adopted exposure limits recommended by national and international radiation protection standards committees, such as the National Council on Radiation Protection and Measurements and the International Commission on Radiological Protection, and has relied upon conservative designs and disciplined operating and maintenance practices to minimize radiation exposure to levels well below these limits.

High Dose Studies

The human study populations which have contributed a large amount of information about the biological effects of radiation exposure include the survivors of the atomic bombings of Hiroshima and Nagasaki, x-rayed tuberculosis patients, victims of various radiation accidents, patients that have received radiation treatment for a variety of diseases, radium dial painters, and inhabitants of South Pacific islands that received unexpected doses from fallout due to early nuclear weapons tests. All of these populations received high or very high exposures.

The studies of atomic bomb survivors have provided the single most important source of information on the immediate and delayed effects of whole body exposure to ionizing radiation. The studies have been supported for over 40 years by the U. S. and Japanese governments and include analysis of the health of more than 100,000 survivors of the bombings. Continued follow-up of the Japanese survivors has changed the emphasis of concern from genetic effects to the induction of cancer (ref 24).

The induction of cancer has been the major late effect of radiation exposure in the atomic bomb survivors. The tissues most sensitive to the induction of cancer appear to be the bone marrow, thyroid, and female breast. Other cancers linked to radiation, but with a lower sensitivity, include cancers of the lung, stomach, colon, bladder, and esophagus. A wave-like pattern of leukemia induction was seen over time beginning approximately two years after exposure, peaking within 10 years of exposure and diminishing to near baseline levels after 30 years. For other cancers, a statistically significant excess was observed ten or more years after exposure, and the excess risk continues to rise slowly with time (ref 25).

While it is often stated that radiation causes all forms of cancer, many forms of cancer actually show no increase among atomic bomb survivors. These include chronic lymphocytic leukemia, Hodgkin's disease, and cancers of the liver, pancreas, prostate, and testis (ref 24).

To understand the impact of cancer induction from the atomic bombings, it is necessary to compare the number of radiation-related cancers to the total number of cancers expected in the exposed group. In a study sub-group of over 40,000 survivors with doses in the range of 1 rad to 400 rads from the bombings, 3,435 had died from cancer by 1985. Of these, 340 cancer deaths are attributed to radiation exposure (ref 25). At doses below 20 rads, the Japanese data have not revealed a statistically significant excess of cancer (ref 19). The cancer mortality experience of the other human study populations exposed to high doses referenced above is generally consistent with the experience of the Japanese atomic bomb survivors (ref 17).

About 30 years ago the major concern of the effects from radiation exposure centered on possible genetic changes. Ionizing radiation was known to cause such effects in many species of plants and animals. However, intense study of nearly 70,000 off-spring of atomic bomb survivors has failed to identify any increase in genetic effects. Based on a recent analysis, humans now appear less sensitive to the genetic effects from radiation exposure than previously thought (ref 24).

Radiation induced cataracts have been observed in atomic bomb survivors and persons treated with very high doses of x-rays to the eye. Approximately 20 years ago, potential cataract induction was considered a matter of concern. However, more recent research indicates the induction of cataracts by radiation is considered to require a high threshold dose. The National Academy of Sciences has stated the threshold for a vision-impairing cataract under conditions of protracted exposure is thought to be no less than 800 rem, which greatly exceeds the amount of radiation that can be accumulated by the lens through occupational exposure to radiation under normal working conditions (ref 17).

Radiation damage to the reproduction cells at very high doses has been observed to result in sterility. Impairment of fertility requires a dose large enough to damage or deplete most of the reproductive cells and is close to a lethal dose if exposure is to the whole body. The National Academy of Sciences estimates the threshold dose necessary to induce sterility in the male, or female, is approximately 350 rem, or more, in a single dose (ref 17). As in the case of cataract induction, this dose far exceeds the dose that can be received from occupational exposure under normal working conditions.

Developmental abnormalities were observed among children of the atomic bomb survivors that received high prenatal exposure (that is, their mother was pregnant at the time of the exposure). These abnormalities included stunted growth, small head size, and mental retardation. Additionally, recent analysis suggests that during a certain stage of development (the 8th to 15th week of pregnancy) the developing brain appears to be especially sensitive to radiation. A slight lowering of IQ might follow even relatively low doses of 10 rem or more (ref 17).

From this discussion of the health effects observed in studies of human populations exposed to high doses of radiation, it can be seen that the most important of the effects from the standpoint of occupationally exposed workers is the potential for induction of cancer (ref 17).

Low Dose Studies

The cancer causing effects of radiation on the bone marrow, female breast, thyroid, lung, stomach, and other organs reported for the atomic bomb survivors are similar to findings reported for other irradiated human populations. With few exceptions, however, the effects have been observed only at high doses and high dose rates. Studies of populations chronically exposed to low-level radiation have not shown consistent or conclusive evidence of an associated increase in the risk of cancer (ref 17). Attempts to observe increased cancer in human population exposed to low doses of radiation have been difficult.

One problem in such studies is the number of people needed to provide sufficient statistics. As the dose to the exposed group decreases, the number of people needed to detect an increase in cancer goes up at an accelerated rate. For example, for a group exposed to 1 rem (equivalent to the average lifetime accumulated dose in the Naval Nuclear Propulsion Program) it would take more than 500,000 people in order to detect an excess in lung cancers based on current estimates of the risk (ref 26). This is more than three times the number of persons that have performed nuclear work in all the Naval shipyards over the last four decades. Another limiting factor is the relatively short time since low dose occupational exposure started being received by large groups of people. As discussed previously, data from the atomic bomb survivors indicates a long latency period between the time of exposure and expression of the disease.

There is also the compounding factor that cancer is a generalization for a group of approximately 300 separate diseases, many being relatively rare and having different apparent causes. It is difficult to analyze low dose study data to eliminate the possibility that some factor other than radiation may be causing an apparent increase in cancer induction. This difficulty is particularly apparent in studies of lung cancer, for example, where smoking is such a common exposure, is poorly documented as to individual habits, and is by far the primary cause of lung cancer. Because cancer induction is statistical in nature, low dose studies are limited by the fact that an apparent observed small increase in a cancer may be due to chance alone.

Despite the above mentioned problems, and the lack of consistent or conclusive evidence from such studies to date, low dose studies fulfill an important function. They are the only means available for eventually testing the validity of current risk estimates derived from data accumulated at higher doses and higher dose rates.

Low dose groups that have been, and are currently being, studied include groups exposed as a result of medical procedures; exposed to fallout from nuclear weapons testing; living near nuclear installations; living in areas of high natural background radiation; and occupationally exposed to low doses of radiation. The National Academy of Sciences has reviewed a number of the low dose studies in references 17 and 23. Their overall conclusion from reviewing these studies was:

> "Studies of populations chronically exposed to low-level radiation, such as those residing in regions of elevated natural background radiation, have not shown consistent or conclusive evidence of an associated increase in the risk of cancer." (ref 17)

This conclusion has been supported by studies that have been completed since reference 17 was published. For example in 1990, the National Cancer Institute completed a study of cancer in populations living near 62 nuclear facilities in the U. S. that have been in operation prior to 1982. This study included commercial nuclear power plants and Department of Energy facilities involved in activities employing radioactive materials. The conclusion of the National Cancer Institute study was:

> "There was no evidence to suggest that the occurrence of leukemia or any other form of cancer was generally higher in

> the (counties near the nuclear facilities) than in the (counties remote from nuclear facilities)." (ref 27)

At the request of the Three Mile Island Public Health Fund, an investigation was performed by independent researchers of whether or not the pattern of cancer in the 10-mile area surrounding the Three Mile Island nuclear plant had changed after the TMI-2 accident in March 1979 and, if so, whether the change related to radiation releases from the plant. A conclusion of this study was:

> "For accident emissions, the authors failed to find definite effects of exposure on the cancer types and population subgroups thought to be most susceptible to radiation. No associations were seen for leukemia in adults or for childhood cancers as a group." (ref 28)

Of particular interest to workers in the Naval Nuclear Propulsion Program are studies of groups occupationally exposed to radiation. A recent survey of radiation-worker populations in the U. S. shows there are about 350,000 workers currently under study (ref 26). For more than a decade, Naval Nuclear Propulsion Program personnel, including those at shipyards and in the Fleet, have been included among populations being studied. These studies are discussed below.

In 1978, Congress directed the National Institute for Occupational Safety and Health (NIOSH) to perform a study of workers at the Portsmouth Naval Shipyard (PNS) in response to an article in the Boston Globe newspaper describing research by Dr. T. Najarian and Dr. T. Colton, assisted by the Boston Globe staff. The report alleged that Portsmouth workers who were occupationally exposed to low-level radiation suffered twice the expected rate of overall cancer deaths and five times the expected rate of leukemia deaths. Congress also chartered an independent oversight committee of nine national experts to oversee the performance of the study in order to assure technical adequacy and independence of the results. The following is a NIOSH summary of the study and their results. This summary was prepared by NIOSH at the conclusion of their last study phase in February 1986.

> "In December, 1980, NIOSH researchers completed the first report on a detailed study of the mortality among employees of the shipyard. Included in the study were all those who had been employed at PNS since January 1, 1952 (the earliest date that records existed that could identify former employees). In this report it was concluded that 'Excesses of deaths due to malignant neoplasms and specifically due to neoplasms of the blood and blood-forming tissue, were not evident in civilian workers at PNS...' in contrast to the results of the original study conducted by the physician. Later, in an investigation to determine why the physician's study results differed so greatly from the NIOSH

> study, a number of shortcomings in his original study were found that resulted in incorrect conclusions.
>
> "To make more certain that workers who had died from leukemia did not die because of radiation exposures received at the shipyard, a second study was conducted. That study compared the work and radiation histories of persons who died of leukemia, with persons who did not. In this analysis, again, no relationship was found between leukemia and radiation, although the NIOSH researchers were unable to rule out the possibility of other occupational exposures having a role.
>
> "In this current and third NIOSH paper, we investigated the role that radiation and other occupational exposures at the shipyard may have had in the development of lung cancer. This study is an outgrowth of an observation made in the 1980 NIOSH study referred to above. The observation was that persons with greater than 1 rem cumulative exposure to radiation had an increase in lung cancer.
>
> "In this report entitled, 'Case Control Study of Lung Cancer in Civilian Employees at the Portsmouth Naval Shipyard,' we compared the work and radiation histories of persons who died of lung cancer with persons who did not. We found that persons with radiation exposures in excess of 1 rem had an excess risk of dying of lung cancer, but the radiation was in all likelihood not the cause. This was due to the fact that persons with radiation exposure tended also to have exposure to asbestos (a known lung carcinogen) and to welding by-products (suspected to contain lung carcinogens)."

Thus, the earlier reports of excess cancer rates among Portsmouth Naval Shipyard workers exposed to low-level radiation were not substantiated by NIOSH. The NIOSH studies were published in the scientific literature in references 29 through 32.

In 1991, researchers from the Johns Hopkins University, Baltimore, Maryland, completed a more comprehensive epidemiological study of the health of workers at the six Navy shipyards and two private shipyards that service Navy nuclear-powered ships (ref 33). This independent study evaluated a population of 70,730 civilian workers over a period from 1957, beginning with the first overhaul of the first nuclear-powered submarine USS NAUTILUS, through 1981, to determine whether there was an excess risk of leukemia or other cancers associated with exposure to low levels of gamma radiation.

This study did not show any cancer risks linked to radiation exposure. Furthermore, the overall death rate among radiation-exposed shipyard workers was less than the death rate for the general U. S. population. It is well recognized that many worker populations have lower mortality rates than the general population, because the workers must be healthy to perform their work. This study shows that the radiation-exposed shipyard population falls in this category.

The death rate for cancer and leukemia among the radiation-exposed workers was slightly lower than that for non-radiation-exposed workers and that for the general U. S. population. However, an increased rate of mesothelioma, a type of respiratory system cancer linked to asbestos exposure, was found in both radiation-exposed and non-radiation-exposed shipyard workers, although the number of cases was small reflecting the rarity of this disease in the general population. The researchers suspect that shipyard worker exposure to asbestos in the early years of the Program, when the hazards associated with asbestos were not as well understood as they are today, might account for this increase.

In conclusion, the Johns Hopkins study found no evidence to conclude that the health of people involved in work on U. S. nuclear-powered ships has been adversely affected by exposure to low levels of radiation incidental to this work. Additional studies are planned to investigate the observations and update the study with data beyond 1981.

In 1987, the Yale University School of Medicine completed a study (ref 34) sponsored by the U. S. Navy Bureau of Medicine and Surgery of the health of Navy personnel assigned to nuclear submarine duty between 1969 and 1981. The objective of the study, begun in 1979, was to determine whether the enclosed environment of submarines has had any impact on the health of these personnel. Although not strictly designed as a cancer study of a low dose population, the study did examine cancer mortality as a function of radiation exposure. The study concluded that submarine duty has not adversely impacted the health of crewmembers. Furthermore, there was no correlation between cancer mortality and radiation exposure. These observations were based on comparison of death rates among the approximately 76,000 officers and enlisted submariners (all who served between 1969 and 1981) against an aged-matched peer group. The results of this study were published in the Journal of Occupational Medicine (ref 35).

In 1989, an article in Navy News and Undersea Technology reported on the Yale study with inaccurate statements regarding the study results. The article alleged that sailors in Fleet ballistic missile submarines (SSBNs) had an elevated cancer rate compared to national rates. The allegations were based on an incorrect interpretation of the data. The Navy News article only considered the cancer mortality of enlisted sailors from SSBNs that had been discharged from the Navy and reported an increase in the number of cancers versus the number expected. However, the article failed to recognize that the Navy medically discharges service members with serious diseases who are no longer fit for full duty. Thus, the cancer death data for the active duty group of SSBN sailors was skewed low, and the discharged group was skewed high. The active duty and discharged groups must be combined to account for the skewing resulting from the Navy's medical discharge policy, in order for a valid comparison to be made with the civilian peer group. Table 7, derived from the Yale study results, shows this comparison for enlisted submariners. The officer data show similar trends. (Note the SSBN population was larger than the fast attack submarine (SSN) population, hence the larger number of expected cancer deaths. Also, SSBN & SSN is defined as service aboard both types of submarines.) As seen in Table 7, cancer deaths among both SSBN and SSN sailors are actually less than cancer deaths among their age-matched peers in the civilian population.

TABLE 7

YALE STUDY RESULTS

Enlisted Submariners (76,160)	Cancer Deaths Observed	Cancer Deaths Expected
SSBN	55	61
SSN	18	36
SSBN & SSN	4	12
Total	77	109

Numerical Estimates of Risk from Radiation

One of the major aims of the studies of exposed populations as discussed above is to develop numerical estimates of the risk of radiation exposure. These risk estimates are useful in addressing the question of how hazardous radiation exposure is, evaluating and setting radiation protection standards, and helping resolve claims for compensation by exposed individuals.

The development of numerical risk estimates has many uncertainties. As discussed above, excess cancers attributed to radiation exposure can only be observed in populations exposed to high doses and high dose rates. However, the risk estimates are needed for use in evaluating exposures from low doses and low dose rates. Therefore, the risk estimates derived from the high dose studies must be extrapolated to low doses. This extrapolation introduces a major uncertainty. The shape of the curve used to perform this extrapolation becomes a matter of hypothesis (that is, assumption) rather than observation. The inability to observe the shape of this extrapolated curve is a major source of controversy over the appropriate risk estimate.

Scientific committees, such as the National Academy of Science (ref 17), the United Nations Scientific Committee on the Effects of Atomic Radiation (ref 19), and the National Council on Radiation Protection and Measurements (ref 12) all conclude that accumulation of dose over weeks, or months, as opposed to in a single dose, is expected to reduce the risk appreciably. A dose rate effectiveness factor (DREF) is applied as a divisor to the risk estimates at high doses to permit extrapolation to low doses. The National Academy of Sciences (ref 17) suggested that a range of DREF's between 2 and 10 may be applicable and reported a best estimate of 4 based on laboratory animal studies. However, despite these conclusions by the scientific committees, some critics argue that the risk actually increases at low doses while others argue that cancer induction is a threshold effect and the risk is zero below the threshold dose. As stated at the beginning of this section, the Naval Nuclear Propulsion Program has always conservatively assumed radiation exposure, no matter how small, may involve some risk.

In 1972, both the United Nations Scientific Committee on the Effects of Atomic Radiation and the National Academy of Sciences-National Research Council Advisory Committee on the Biological Effects of Ionizing Radiations issued reports (refs 36 and 37) which estimated numerical risks for specific types of cancer from radiation exposure to humans. Since then, national and international scientific committees have been periodically re-evaluating and revising these numerical estimates based on the latest data and information. The most recent risk estimates are from the same two committees and are contained in their 1988 and 1990 reports, respectively (refs 17 and 19). In these reports, both committees provided risk estimates which were larger than the risk estimates in their previous reports. This increase in the new estimates was due to the use of new models for projecting the risk into the future, revised dose estimates for survivors of the Hiroshima and Nagasaki atomic bombs, and additional data on the cancer experience by both atomic bomb survivors and persons exposed to radiation for medical purposes. A risk estimate for radiation-induced cancer derived from the most recent analysis, references 17 and 19, can be briefly summarized as follows:

> In a group of 10,000 workers in the U. S., a total of about 2,000 (20 percent) will normally die of cancer. If each of the 10,000 received over his or her career an additional one rem, then an estimated 4 additional cancer deaths (0.04 percent) might occur. Therefore, the average worker's lifetime risk of cancer has been increased nominally from 20 percent to 20.04 percent.

The above risk estimate was extrapolated from estimates applicable to high doses and dose rates using a DREF of about 2. This estimate probably overstates the true lifetime risk at low doses and dose rates, because a DREF of 2 is at the low end of probable DREF values. The National Academy of Sciences (ref 17), in assessing the various sources of uncertainty, concluded that the true lifetime risk may be contained within an interval which extends from zero to about a factor of three higher than the above. The Academy points out that the lower limit of uncertainty extends to zero risk, "as the possibility that there may be no risks from exposure comparable to external natural background radiation cannot be ruled out."

These statistics can be used to develop a risk estimate for personnel exposed to radiation associated with Naval nuclear propulsion plants. As stated previously, the average lifetime accumulated exposure is 1.2 rem for all Shipyard personnel and 0.8 rem for all Fleet personnel. Therefore, based on a Program-wide average of about 1 rem and the risk estimate presented above, the average worker's lifetime cancer risk in the Naval Nuclear Propulsion Program may be increased a very small amount, from 20 percent to 20.04 percent.

Risk Comparisons

Table 8 compares calculated risks from occupational exposure in the Naval Nuclear Propulsion Program to other occupational risks. This allows us to evaluate the relative hazard of this risk versus risks normally accepted in the workplace. It should be kept in mind that the radiation risk is calculated based on risk estimates, whereas the other occupational risks are based on actual death statistics for the occupation.

TABLE 8

LIFETIME OCCUPATIONAL RISKS

Occupation (ref 12)	Lifetime Risk[5] Percent
Mining, quarrying	2.8
Agriculture	2.2
Construction	1.8
Transportation and Public Utilities	1.3
All Industries Average	0.5
Government	0.4
Services	0.3
Manufacturing	0.3
Trade	0.2
Radiation exposure associated with Naval nuclear propulsion plants (risk estimate)	0.04

Further perspective on the lifetime risk from radiation exposure in the Naval Nuclear Propulsion Program may be gained by comparison to other everyday risks as shown in Table 9.

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[5] Assumes working from 18 to 65 (47 years).

TABLE 9

SOME COMMONPLACE LIFETIME RISKS

Risk (ref 38)	Lifetime Risk[6] Percent
Smoking	12
Motor Vehicle Accidents	1.3
Home Accidents	0.79
Falls	0.45
Drowning	0.26
Fires	0.20
Accidental Poisoning	0.10
Firearms	0.07
Electrocution	0.04
Radiation exposure associated with Naval nuclear propulsion plants (risk estimate)	0.04

Low-Level Radiation Controversy

In low-level radiation, as in other areas, a very effective way to frighten people is to claim that no one knows what the effects are. This has been repeated so often that it has almost become an article of faith that no one knows the effects of low-level radiation on humans. The critics are able to make this statement because, as discussed above, human studies of low-level radiation exposure are unable to be conclusive as to whether or not an effect exists in the exposed groups, because of the extremely low incidence of an effect. Therefore, assumptions are needed regarding extrapolation from high dose groups. The reason low dose studies are not able to be conclusive is because the risk, if it exists at these low levels, is too small to be seen in the presence of all the other risks of life.

The fact that a controversy exists is evidence that the radiation risk is small.

In summary, the effect of radiation exposures at occupational levels is extremely small. There are physical limits to how far scientists can go to ascertain precisely the size of this risk, but it is known to be small. Instead of proclaiming how little is known about low-level radiation, it is more appropriate to emphasize how much is known about the small actual effects.

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[6] Smoking assumes at risk from 32 to 72 (40 years) and Motor Vehicle Accidents assume at risk from 18 to 72 (54 years). Other risks assume at risk for lifetime (72 years).

Conclusions on the Effects of Radiation on Personnel

This perspective provides a better position to answer the question, "Is radiation safe?" If safe means zero effect, then the conclusion would have to be that radiation may be unsafe. But to be consistent, background radiation and medical radiation would also have to be considered unsafe. Or more simply, being alive is unsafe.

"Safe" is a relative term. Comparisons are necessary for actual meaning. For a worker, safe means the risk is small compared to other risks accepted in normal work activities. Aside from work, safe means the risk is small compared to the risks routinely accepted in life.

Each recommendation on limits for radiation exposure from the scientific and advisory organizations referenced herein has emphasized the need to minimize radiation exposure. Thus, the Naval Nuclear Propulsion Program is committed to keeping radiation exposure to personnel as low as reasonably achievable. No level of radiation exposure has been identified for which responsible organizations have agreed there is no effect. Similarly, it is difficult to find a single activity of man for which one can confidently state the risk is zero. However, the above summaries show that the risk from radiation exposure associated with Naval nuclear propulsion plants is low compared to the risks normally accepted in industrial work and in daily life outside of work.

CLAIMS FOR RADIATION INJURY TO PERSONNEL

Personnel who consider they have or might have had occupational injury may file claims. Naval shipyard personnel are employees of the U. S. Government and therefore file claims with the U. S. Department of Labor's Office of Workers' Compensation. Shipyards hold no hearings on injury claims. They are not handled in an adversary procedure. The claim does not even have to be filed through the shipyard. The shipyard is not permitted to appeal a decision, but the employee may appeal. The primary consideration in the Federal laws and procedures set up for injury compensation is to take care of the Federal employee. The program to compensate Federal employees is well publicized.

In private shipyards injury compensation claims are handled under the Longshore and Harbor Workers' Compensation Act. The claim may be handled through the shipyard's insurance carrier or by a U. S. Department of Labor claims examiner. Either the employee or the employer may appeal.

Claims for military personnel concerning prior duty are handled through the Veterans Administration.

There have been a total of 256 claims filed for injury from radiation associated with Naval nuclear propulsion plants. One hundred thirty originated from employees of the six Naval shipyards, fifty-eight from private shipyards, and sixty-eight from Navy personnel. These claims are summarized in Table 10. As shown in Table 10, more than half the claims have been filed for injuries other than cancer or leukemia. Three-fourths of the claims filed for cancer or leukemia involved workers with lifetime radiation exposures less than the 5 rem, which is the exposure a nuclear worker is permitted to receive in one year by Federal Regulations.

TABLE 10

CLAIMS FOR RADIATION INJURY TO PERSONNEL

Injury Claimed	Claims Filed	Claims Awarded	Claims Denied or Deferred	Claims Active
Leukemia	38	3	33	2
Cancer Other Than Leukemia	89	1	85	3
Other	129	5	120	4
TOTAL	256	9	238	9

Naval shipyard personnel's workers' compensation claims are generally decided upon by the Office of Workers' Compensation within one to two years of filing. The Longshore and Harbor Workers' Compensation Act, however, will not require a decision on a case subsequent to filing unless it is actively pursued by the claimant. For cases that are not actively pursued, the claim may lie dormant for many years theoretically to be pursued at a later date, whereupon a decision will be made. For the purpose of Table 10, claims which have had no activity in the last five years are listed as deferred.

Nine claims have been awarded for which radiation was an alleged causal agent: three for leukemia in 1968, 1979, and 1991; four for cataracts of the eyes in 1971, 1974, 1977, and 1982; one for leukocytosis in 1969, and one for bile duct/pancreatic cancer in 1980. The Office of Workers' Compensation awarded three claims and the Veterans Administration awarded six claims. For VA claims, other considerations such as whether the injury is reasonably considered to have occurred while the claimant was in the Armed Forces and other causal factors are used when awarding claims. The Navy considers all nine of these awards were unjustified on the basis of radiation exposure as follows:

- One leukemia case had a lifetime occupational exposure of 5.38 rem. The claimant had also received hundreds of rem in medical radiation exposure for adenoids. If radiation were to be selected as the cause of this leukemia, then the occupational exposure could not have been more than a tiny part of the total radiation exposure.

- The second leukemia case had a lifetime occupational exposure of 1.00 rem. This amount of radiation exposure is small and less than 10 percent of the amount of exposure the claimant will receive during his life from natural background and medical radiation.

- The third leukemia case had a lifetime occupational exposure of 4.20 rem (2.98 rem of which was received while in the U. S. Navy). This amount of exposure is less than 10 percent of the exposure the claimant was allowed under Federal limits for the twelve years he was occupationally exposed to ionizing radiation.

- Two of the cataract cases had lifetime radiation exposures of about 3 rem, one case had less than 1 rem, and one case had 0.02 rem. Of these cases, even the highest exposure, 3 rem, is hundreds of times smaller than needed to produce cataracts in the eyes.

- The leukocytosis (elevated white blood cell count) case had a lifetime occupational exposure of 15.5 rem which was received over an eight year period. This case was evaluated by the medical research center of a national laboratory, which concluded that the cause of the leukocytosis was unknown. In addition, leukocytosis has not been shown to be associated with low-level occupational radiation exposure.

- The bile duct and pancreatic cancer case was awarded for a lifetime occupational exposure of 2.37 rem. This amount of radiation is less than the quarterly limit of 3 rem and the annual limit of 5 rem. Further, this person received about four times the amount of his occupational exposure from natural background and medical exposures over his lifetime.

In addition to the above claims, six suits have been filed in court alleging injury from radiation. One suit involved leukemia; three involved cancers; and the two others did not involve a cancer. Four of these suits were dismissed, one was settled, and one is pending.

AUDITS AND REVIEWS

Checks and cross-checks, audits, and inspections of numerous kinds have been shown to be essential in maintaining high standards of radiological controls. First, each worker is specially trained in radiological controls as it relates to his own job. Second, written procedures exist which require verbatim compliance. Third, radiological controls technicians and their supervisors oversee radioactive work. Fourth, personnel independent of radiological controls technicians are responsible for personnel radiation exposure records.

Fifth, a strong independent audit program is required covering all radiological controls requirements. In all shipyards this radiological audit group is independent of the radiological controls organization and its findings are reported regularly to senior shipyard management, including the shipyard commander. This group performs continuing surveillance of radioactive work. It conducts in-depth audits of specific areas of radiological controls. This group checks all radiological controls requirements at least annually.

Sixth, the U. S. Department of Energy assigns to each shipyard a representative who reports to the Director of the Naval Nuclear Propulsion Program at headquarters. One assistant to this representative is assigned full time to audit and review radiological controls, both in nuclear-powered ships and in the shipyard. Seventh, Naval Nuclear Propulsion Program headquarters personnel conduct periodic inspections of radiological controls in each shipyard. Similarly, there are multiple levels of audits and inspections for the other Naval shore facilities, tenders, and nuclear-powered ships.

In addition, various aspects of the Naval Nuclear Propulsion Program have been reviewed by other Government agencies. For example, the National Institute for Occupational Safety and Health conducted an evaluation of the radiological controls program at Portsmouth Naval Shipyard in conjunction with its mortality study at the shipyard (discussed earlier in this report). NIOSH published the results of its evaluation in a report (ref 39) in April 1983, which stated the following conclusions (quoted verbatim):

- The employee dose data provided NIOSH by Portsmouth Naval Shipyard is complete and provides a reasonable estimate of the individual worker's dose.
- The Portsmouth Naval Shipyard personnel dosimetry program provides accurate internal and external dose data.
- The external and internal doses received by Portsmouth Naval Shipyard personnel are low compared to present occupational exposure guidelines.

- The probability of unreported accidents/incidents or undocumented exposures is extremely small.
- The radiological controls employed are adequate to protect the worker from internal and external hazards.
- The impact of the nuclear work at Portsmouth Naval Shipyard to the surrounding environment is minimal or negligible.
- Nuclear operations at Portsmouth Naval Shipyard are not contributing a significant radiation dose to the general public.

ABNORMAL OCCURRENCES

It is a fact of human nature that people make mistakes. The key to a good radiological controls program is to find the mistakes while they are small and prevent the combinations of mistakes that lead to more serious consequences. The preceding section on inspections supports the conclusion that the Naval Nuclear Propulsion Program gives more attention to errors and their prevention than to any other single subject. Requiring constant focus on improving performance of radiological work has proven effective in reducing errors.

In addition, radiological controls technicians are authorized and required to stop anyone performing work in a manner which could lead to radiological deficiencies. One definition of "deficiency" is a failure to follow a written procedure verbatim. However, the broadest interpretation of the term "deficiency" is used in the Navy's radiological controls program. Anything involved with radiation or radioactivity which could have been done better is also considered a radiological deficiency.

Radiological deficiencies receive management attention. There is a higher level of deficiency that is defined as a radiological incident. Incidents receive further management review, including evaluation by senior personnel at headquarters and review by the Director of the Naval Nuclear Propulsion Program. Improvement programs over the years have constantly aimed at reducing the numbers of radiological incidents. As improvements occurred, the definition of what constituted an incident was changed to define smaller deficiencies as incidents. These changes were necessary so that the incident reporting system would continue to play a key role in upgrading radiological controls. As a result, it is not practicable to measure performance over time merely by counting numbers of radiological incidents or deficiencies.

The Department of Energy and its predecessors have used a separate reporting system that has been nearly constant over time and therefore can be used as a basis for comparison. This system defines a Type A radiation exposure occurrence as an event which causes an individual's external radiation exposure to exceed 25 rem in one incident or one year (ref 40). The Nuclear Regulatory Commission uses a similar criteria to define an abnormal occurrence; abnormal occurrences are included in the NRC's quarterly report to Congress. The Navy regularly evaluates radiological events using these criteria for comparison.

Since the beginning of operations in the Naval Nuclear Propulsion Program, there has not been a single incident which met the criteria of a Type A or abnormal occurrence.

The policy of the Navy is to provide for close cooperation and effective communication with state radiological officials involving occurrences that might cause concern because of radiological effects associated with the ships or shore facilities. The Navy has reviewed radiological matters with state radiological officials in the states where Naval nuclear-powered ships are based or overhauled. Although there has never been an abnormal occurrence which has resulted in radiological effects to the public outside these facilities or which resulted in radiological injury to residents of the states working inside these facilities, states were notified when inquiries showed public interest in the possibility such events had occurred.

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OCCUPATIONAL SAFETY, HEALTH AND OCCUPATIONAL MEDICINE REPORT

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SUMMARY

The Naval Reactors Program is a joint Department of Energy (DOE)/Department of the Navy Program with central control by a single headquarters organization. The Program is responsible for two DOE laboratories, two DOE Sites which have prototype Naval nuclear propulsion plants (one of which also operates the Expended Core Facility), one DOE site which is currently undergoing site inactivation, and one Naval training facility which has two moored training ships.

The Naval Reactors Program faces the unique challenge of coherently integrating and managing DOE testing and Navy training responsibilities, DOE and Navy facilities, civilian and military personnel, and DOE and Navy health and safety standards. Successful integration requires special technical knowledge and experience in selecting and implementing standards which ensure the safe training of Navy personnel in a realistic environment.

The same principles of personal responsibility, technical knowledge, rigorous training, and auditing that have been applied to achieve the Naval Reactors Program strong nuclear safety record are applied to Occupational Safety, Health, and Occupational Medical (OSHOM) programs. A multi-tier, defense in depth approach which incorporates safety in all levels of work is used throughout the Program. Primary responsibility for employee safety and health resides with operations management and the workers themselves, with assistance and oversight from industrial hygiene, safety, and medical professionals. Workers undergo safety and health training and work to written requirements. Inspection and feedback systems are designed to provide continuous improvement.

This annual report describes the non-radiological aspects of OSHOM programs at Naval Reactors DOE laboratory and prototype training facilities and the Moored Training Ship Facility. Included in this report are performance indicators which measure the effectiveness of OSHOM programs. Performance indicators, such as injury and illness incidence rates and lost workdays, are provided for a five year period through 1995 in Figures 1-3. When these indicators are compared for the Naval Reactors Program, DOE, and general industry, it can be seen that the Program has maintained rates less than one third the incidence rates of general industry in all categories and is substantially below DOE incidence rates.

A fourteen month comprehensive assessment of the Program's environmental, safety, and health practices was conducted by the General Accounting Office (GAO) in 1990-1991. The GAO reported that there were "no significant deficiencies." Such a finding provides independent evidence that the Naval Reactors Program is providing a safe and healthy workplace while meeting the challenges of integrating civilian and military standards in a unique research and training environment.

NAVAL REACTORS PROGRAM BACKGROUND, MISSION, AND FACILITIES

Background

The Naval Reactors Program (hereafter referred to as "the Program") is comprised of military personnel and civilians who design, build, operate, maintain, and manage the nuclear-powered ships and facilities which support the U.S. nuclear-powered Naval fleet. The Program has a broad reach, maintaining responsibility for nuclear propulsion matters from cradle-to-grave. Program responsibilities are delineated in Presidential Executive Order 12344 of February 1, 1982, and Public Law 98-525 of October 19, 1984 (42 USC 7158). These responsibilities encompass:

- The Navy's nuclear-powered warships;
- Two research and development laboratories;
- Contractors responsible for the design, procurement, and construction of propulsion plant equipment;
- Shipyards that construct, overhaul, and service the propulsion plants of nuclear-powered vessels;
- Navy support facilities and tenders;
- Nuclear power schools and Naval Reactors training facilities; and
- The Naval Nuclear Propulsion Program Headquarters organization and field offices.

The Government-owned, contractor-operated Bettis and Knolls Atomic Power Laboratories are research and development laboratories devoted solely to Naval nuclear propulsion work. With combined staffs of approximately 4,600 engineers, scientists, technicians, and support personnel, their mission is to develop the most advanced Naval nuclear propulsion technology and to provide technical support for the continued safe, reliable operation of all existing Naval reactors.

The Bettis Atomic Power Laboratory operates the Expended Core Facility at the Naval Reactors Facility in Idaho. At the Expended Core Facility, naval spent nuclear fuel from nuclear-powered warships and the Program's prototypes is examined for evidence of any unusual conditions such as unexpected corrosion, unexpected wear, or structural defects. The examinations provide data on current reactor performance, validate models used to predict future performance, and support research to improve reactor design. This facility also prepares naval spent nuclear fuel which has been examined for storage and disposal.

The Knolls Atomic Power Laboratory operates land based prototype nuclear propulsion plants in New York. Prototype facilities provide platforms for the operational testing of new designs and promising new technologies under typical operating conditions prior to introduction into the fleet. The prototype facilities also support the unique training requirements of the Program and are staffed by highly qualified instructors. These facilities provide for hands-on training so that, prior to their first sea tour, every operator has qualified on an operating nuclear reactor.

The Knolls and Bettis laboratories are also responsible for shutdown prototype nuclear propulsion plants in New York, Idaho, and Connecticut which are in various stages of inactivation and decommissioning.

To augment its hands-on training resources, the Program established the Moored Training Ship Facility at the Naval Weapons Station in Charleston, South Carolina in 1990. Two nuclear-powered submarines which have been decommissioned and converted for training are moored at the facility. Navy personnel operate the facility with the assistance of a technical staff from one of the Program's research and development laboratories.

Scope of Report

The Program is solely responsible for OSHOM matters at its DOE laboratories and prototype facilities which are operated exclusively for the Program. Within the Navy Occupational Safety and Health (NAVOSH) Program, the Naval Reactors Program is responsible for OSHOM matters at the Moored Training Ship Facility. Non-radiological OSHOM matters at other Navy facilities (e.g. shipyards or support facilities) are the primary responsibility of other Navy organizations (the Program often works with these organizations on OSHOM matters which could affect Naval nuclear propulsion plant operations). Therefore, this report focuses on the OSHOM programs at Program laboratories and their associated prototype training facilities and the Moored Training Ship Facility.

As stated in the summary, this report covers non-radiological OSHOM programs at Program facilities. The Program is also responsible for radiological health and safety at all Program DOE and Navy facilities and ships where Naval nuclear propulsion work is done. Radiological safety and health information for the Program is described in detail in two other reports which are publicly available (references 1 and 2).

This report covers calendar year 1995. Occupational safety and health data for calendar years 1991 through 1995 is included to allow comparison to Program performance in recent years.

Past Operations

Safety, Industrial Hygiene, and Occupational Medical programs were developed and implemented in the earliest years of the Program in the form of documented principles, practices, procedures, and facility safety manuals. The Atomic Energy Act of 1954 assigned to the Atomic Energy Commission (AEC), the predecessor to the DOE, responsibility for regulation of activities conducted pursuant to the Act to protect safety and health. Basic requirements were promulgated by the AEC Manual, part 0500 (Health and Safety), which established standards applicable to all AEC contractor operations. OSHOM programs were staffed with individuals dedicated to these functions.

Since passage of the Williams-Steiger Occupational Safety and Health Act of 1970 (OSH Act), the national standard of care for occupational safety and health has improved. Under the OSH Act, the Program retained authority for OSHOM programs of its contractors and has mandated proactive programs and practices which are at least as stringent as those required by the Occupational Safety and Health Administration for commercial facilities. The various contractor safety, industrial hygiene, and medical programs have been dynamic and have experienced substantial growth since their inception as new requirements have developed.

Militarily Unique Mission and Facilities

As previously stated, a major responsibility of the Program is to train Navy personnel to operate Naval nuclear propulsion plants. At the Moored Training Ship Facility, this training is conducted aboard specially modified, moored nuclear-powered submarines which have been decommissioned and converted for training. At one Naval Reactors Program DOE facility, training of Naval personnel is conducted in land-based prototype Naval nuclear propulsion plants which are identical in design to the engineering spaces aboard Naval nuclear powered warships. Navy and contractor personnel, who meet the same qualification standards as Navy personnel, conduct the training.

Procedures used by the Program to operate the nuclear reactors and associated systems in the land-based prototype propulsion plants are identical to those used in warships. This includes the use of Navy shipboard occupational safety and health requirements consistent with those applied in the fleet. The Navy safety and health requirements are tailored to meet the militarily unique aspects of the "sea services" and combat roles of warships. This training of Navy personnel in settings and operations identical to those encountered at sea is a fundamental tenet of the Program which directly contributes to the safe operation of Navy shipboard reactors.

In implementing the OSH Act, Executive Order 12196 and 29 CFR 1960 recognized the unique equipment and operations utilized by the military and exempted militarily unique equipment and operations from coverage by OSH Act regulations. Heat stress, lock-out/tag-out procedures, and structural safety requirements (e.g., hand rails) are examples of areas where civilian OSHOM requirements must be reconciled with the configuration and operational requirements of militarily-unique equipment. For such equipment and operations, the Department of Defense occupational safety and health programs ensure that military personnel are protected.

POLICY AND IMPLEMENTATION

Naval Reactors Program Policy

It is the policy of the Naval Reactors Program to eliminate or control workplace hazards at Program facilities such that all employees are provided with a safe and healthful workplace.

OSHOM Program Elements

The control of hazards is accomplished through technical and managerial techniques which are recognized as industry standards. These techniques include:

- Establishment of responsibilities: All levels of management and supervision are assigned accountability for the safety and health of their workers and peers.
- Qualified Professional Staffing: The OSHOM programs at Program facilities include certified professionals in the disciplines of Occupational Safety, Industrial Hygiene, and Occupational Medicine. In addition, numerous other site personnel are assigned collateral OSHOM duties, such as workplace safety monitors.
- OSHOM Training of Management and Workers: Facility management, supervisors, and employees receive training which addresses policies and procedures, physical and chemical hazard recognition, control strategies and requirements, emergency procedures, and employee information/concern resolution processes.
- Planning: Work plans and specifications are reviewed by facility OSHOM professionals to proactively identify and eliminate or mitigate hazards.
- Emergency Planning: Emergency procedures are well documented. Emergency responders and supervisors must pass initial qualifications and routinely perform drills to maintain and improve their response skills. Trained personnel are available to provide at least first aid capability around the clock.
- Extension of OSHOM Program to Subcontractor Employees: Subcontractors performing work at Program facilities are required by contract to work to safety and health requirements as stringent as those implemented for Program facility employees. Subcontractor compliance with safety and health requirements is overseen by facility personnel.
- Written Requirements: Employees work to written requirements, such as manuals and procedures, which incorporate safety and health requirements.

- Routine, Independent OSHOM Evaluation: Naval Reactors headquarters and field office personnel as well as auditors in the facility's organization provide independent evaluation of OSHOM Programs. Assessments are detailed, formal, documented, and corrective actions are tracked to closure.

Hazard Assessment Systems

Methods of assessing hazards include:

- Baseline safety and industrial hygiene surveys;
- Routine self-inspection and self-appraisal programs;
- Hazard Analysis which evaluates potential hazards associated with certain job categories and/or specific tasks;
- Industrial hygiene monitoring programs that use state-of-the-art equipment and independent laboratory analysis in accordance with nationally recognized procedures;
- Accident investigation systems which ensure timely review, provide written reports, and ensure responsive actions are tracked to closure; and
- Preventive maintenance programs that ensure safety systems function as designed.

Worker Participation

Workers participate in various committees, internal programs, and site audits and inspections. Employee concerns are encouraged to be reported to management, OSHOM staff, or formally documented via an employee concern management system (reference 3). Employee/management communications include follow-up and tracking of identified employee concerns or issues identified during inspections, audits, or committee meetings.

OSHOM REQUIREMENTS

Naval Reactors Program Authority and Responsibility for Occupational Safety and Health

To ensure safe and healthful working conditions for the nation's workers, Congress passed the Occupational Safety and Health Act (OSH Act) of 1970. The OSH Act excludes from coverage activities which are regulated under separate statutory authority, such as the Atomic Energy Act. However, the head of each Federal agency (e.g., DOE) is responsible to establish and maintain an effective and comprehensive occupational safety and health program consistent with the OSH Act.

Within the DOE, authority to set and enforce OSHOM standards at Program facilities is assigned to the Deputy Assistant Secretary for the Office of Naval Reactors pursuant to the Atomic Energy Act of 1954, Executive Order 12344 and Public Law 98-525 (reference 4). These documents establish that the director of the Program is responsible for all matters pertaining to Naval nuclear propulsion including direction and oversight of safety and health matters for all Program facilities and activities.

Because of the OSH Act exclusion and the authority granted DOE, the Naval Reactors Program establishes and enforces OSHOM requirements at Naval Reactors DOE facilities independent of other DOE organizations (e.g., nuclear fuel and weapons production operations). With this authority, the Program ensures that OSHOM standards are applied with a consistent and sound technical basis at its facilities in accordance with the military training mission as discussed earlier.

Within the Navy, the authority to set and enforce OSHOM standards is assigned to the Assistant Secretary of the Navy (Installations and Environment). These standards are contained in OPNAV Instruction 5100.23 and OPNAV Instruction 5100.19 (references 5 and 6). The Program is responsible for the implementation of these Navy instructions at the Moored Training Ship Facility.

Health and Safety Standards Reference Document (HSSRD)

To facilitate a clear definition of applicable requirements and to accomplish the difficult task of integrating civilian and Navy requirements, the Program has developed the HSSRD. The HSSRD contains a listing of all OSHOM standards considered for implementation at Program facilities in each specific topical area of safety and health. The HSSRD contains a description of the primary elements of safety and health standards selected for implementation at each Program facility, along with traceability of those standards to federal regulations, DOE Orders, NAVOSH program requirements, or Program directives. This document is updated as necessary (at least annually) to ensure that the most current standards are applied to facility OSHOM programs.

Implementation of DOE Orders and Navy Occupational Safety and Health Program Requirements

The Naval Reactors Program utilizes DOE Orders in the setting of standards for its DOE facilities. Since DOE Orders are focused on non-military activities, some of the requirements may not be directly applicable to Program activities. Such requirements are modified by the Program as necessary to integrate the requirements with militarily-unique systems and operations to prevent potential conflicts with Navy training requirements and to maintain the prototypes' ship-like environment.

Because the Moored Training Ship Facility is a Naval facility, Navy occupational safety and health requirements are applied (references 5 and 6).

Occupational Medical Program Requirements

The Program occupational medical requirements for civilian DOE facility employees are consistent with the DOE's occupational medical requirements (reference 7). Occupational medical requirements applicable to Naval personnel at DOE facilities and to the Moored Training Ship Facility are those of the Navy (references 5 and 6).

PERSONNEL

Contractor Health and Safety Council

A Contractor Health and Safety Council, whose membership includes senior safety and health professionals from each Program facility, operates within the Program. The purposes of the Council are to (1) provide a forum in which experiences and information can be exchanged, and new safety and health initiatives can be identified and expeditiously implemented, and (2) maintain the HSSRD. These functions are accomplished by regular conferences of the Contractor Health and Safety Council. In addition, the Council meets annually with Program headquarters personnel to review performance and establish objectives for the coming year.

Professional Staffing

Adequate professional staffing is assigned to OSHOM programs to ensure a safe and healthful workplace at all Program facilities. All key professional occupational safety and health staff personnel satisfy, at a minimum, the requirements contained in the Office of Personnel Management standards for Safety and Occupational Health Manager, Safety Engineer, or Industrial Hygienist. Each Program activity is staffed by, or has contractual arrangements with, one or more physicians who are board-eligible occupational medicine physicians or physicians who are trained in occupational medicine.

Professional occupational safety and health personnel are qualified by their academic backgrounds and experience to perform workplace evaluations, technical monitoring, testing, consulting, and other essential functions of their professions. Involvement with professional organizations is supported and facility staff hold memberships in all major safety and industrial hygiene professional societies.

Professional staff hold certifications from the American Board of Industrial Hygiene and/or the Board of Certified Safety Professionals. Such certifications demonstrate that individuals so identified have shown, by successfully passing rigorous examinations, that they have special training, knowledge, and competence in industrial hygiene and/or safety.

The capabilities of all professional staff members are enhanced by attendance at professional technical society meetings, participation in continuing education programs at universities and other recognized training centers, and involvement with internal education and training programs developed by individual Program sites. These activities are designed to improve the safety and health professional's ability to anticipate and recognize potential workplace hazards; measure, analyze, and evaluate occupational safety and health trends; and define and implement effective controls.

OSHOM managers are individuals with education and experience which provides them with special qualifications to manage these programs. These managers report to the site manager (Commanding Officer at the Moored Training Ship Facility) through a management chain in a manner that maintains their independence from production concerns.

The occupational safety and health professionals at Program facilities perform workplace monitoring, evaluate workplace hazards, implement appropriate controls, review work procedures for proper safety controls, analyze safety and health performance indicators, and maintain appropriate records. In general, however, the safety and health staff is not directly involved in site operations unless specific safety issues arise. In such cases, the safety and health staff work with the facility operations staff and Navy personnel to resolve the issue.

Operations Personnel

First-level operations supervisors, such as work-area managers and supervisors, are given primary responsibility for the safety and health of their subordinates. Operations personnel implement standards and procedures developed by the facility safety and health professional staff. Operations personnel are provided general and job specific safety training to enable them to identify safety hazards and unsafe work practices.

Upper level operations management at Program facilities are also responsible for the safety and health of their personnel. They reinforce the importance of safety and health requirements by establishing applicable policies and objectives and assigning appropriate responsibility and authority to all levels of management and supervision.

Each operating facility also maintains a Safety Representative program in which an individual from a work area, such as a department, serves as a Safety Representative. The Safety Representatives are given additional training, attend periodic meetings, and are tasked with monitoring their work area to identify any hazards or unsafe work practices to facility OSHOM personnel.

Naval Reactors Field Office Representatives

All Program facilities have a co-located Naval Reactors field office. The field office is staffed with Naval Reactors personnel who report directly to headquarters and whose function is to ensure contractor compliance with Program requirements. The field office representatives provide independent oversight of facility operations and allow Naval Reactors headquarters to maintain close surveillance of events occurring at the facilities. Each field office has personnel with specific responsibilities in OSHOM matters to provide effective oversight of facility OSHOM programs.

Navy Personnel Assigned to Naval Reactors DOE Facilities

Active duty Navy personnel are assigned to Naval Reactors DOE prototype sites to conduct and receive training in the operation of Naval nuclear propulsion plants. The safety and health of these personnel is the overall responsibility of the Commanding Officer of the Nuclear Power Training Unit, which is located on-site. Each prototype plant has safety representatives who are responsible for ensuring that safety and health requirements are implemented. The safety representatives have access to, and work with the professional safety and health staff at the facility in the resolution of any OSHOM issues.

The Commanding Officer also maintains a liaison with a nearby Navy Branch Medical Clinic which provides occupational medical services to Navy personnel. The facility OSHOM personnel work with the affiliated Naval Branch Medical Clinic to ensure the safety and health of Navy personnel.

Emergency Response Capability

Each Program facility has emergency response capabilities for significant events. At each site, individuals with the appropriate education, training, and qualifications are assigned to respond to the scene of any emergency which may occur, evaluate the circumstances of the emergency, and initiate appropriate corrective actions. A separate site emergency control center is manned when necessary with specially trained personnel to handle a variety of emergencies.

Individuals are assigned to site emergency response teams on the basis of their expertise and experience. Emergency responders participate in frequent drills to improve their qualifications and skills. Major drills involving the entire site emergency response team are conducted periodically and smaller scale drills involving limited participation are conducted more frequently.

With regard to medical emergencies, each operating facility has qualified emergency medical personnel to provide emergency medical care. Most sites are also staffed with one or more medical doctors during day shifts. Additional groups of individuals (e.g., Emergency Medical Technicians) have been specifically trained and assigned to provide medical assistance. Each site has arrangements with a local hospital to provide emergency medical care beyond the capabilities of facility medical personnel.

HAZARD IDENTIFICATION AND ANALYSIS

Regulations, Requirements, and Technical Information

To maintain a current level of knowledge and expertise in this area, members of the occupational safety and health staff:

- Review the Federal Register and subscribe to review services to identify and determine the applicability of new or proposed regulations to Program facilities. The results of these reviews are disseminated to OSHOM and operations personnel.
- Review and incorporate into site procedures applicable safety and health requirements and lessons learned contained in DOE and Navy safety and health bulletins and other relevant documents.
- Maintain professional certification in the fields of Safety, Industrial Hygiene or Occupational Health Nursing.
- Participate in professional societies (e.g., the American Industrial Hygiene Association, and the American Association of Occupational Health Nurses) that provide information via publication of professional journals, national conferences, seminars, and society meetings.
- Discuss and resolve safety and health issues in the Naval Reactors Program Health and Safety Council conferences.

Project Evaluation

Facility projects involving work that could affect the safety and health of personnel are reviewed and evaluated by the respective facility safety and health organizations. These evaluations typically involve review of the work project from initial concept through the development of detailed work procedures or construction plans, and technical specifications. One of the primary functions of this conceptual review is to identify alternate methods or materials which can be employed to eliminate or reduce the hazards associated with the project under review. Safety and health personnel are required to concur that applicable safety and health practices have been integrated into written work procedures and to ensure all applicable fire and life safety code requirements are satisfied.

The qualifications and work practices of subcontractors to perform specific facility project work are evaluated by safety and health personnel to ensure that subcontractor work meets the standards of the Program. The safety and health standards required to be utilized by subcontractors are incorporated directly into the contractual requirements set forth in requests for proposals and purchase orders.

Procurement Reviews

Each Program facility has a formal system to evaluate equipment and chemicals proposed for purchase to minimize or eliminate safety and health hazards. This system includes approval by safety and health organizations of requests for materials or new equipment. Material Safety Data Sheets (MSDSs) for all products or materials proposed for use are reviewed by the facility's safety and health organization prior to their initial use. This allows facility safety and health personnel to identify potential hazards and specify proper protective measures to reduce these hazards.

Hazard Analysis

Hazard analyses, such as job safety analyses or task analyses, are processes used in the Program to review work practices and identify concerns associated with overall work procedures.

Various job categories or facets of complex jobs are evaluated to identify potential hazards. Once potential hazards are identified, actions are taken to minimize the hazard and communicate appropriate precautions. Cognizant supervisors are responsible for ensuring that hazards are addressed and that corresponding task, equipment, or material changes have been implemented. Safety and health professionals may assist supervisors in preparation of an analysis, and in all cases review the hazard analysis for accuracy and completeness.

These analyses are utilized in individual employee training, preparing for planned safety observations, reviewing job procedures after accidents occur, and studying the job for improvements in safety and health methods. Whenever a significant safety or health issue arises, further analyses are conducted and procedures may be altered to incorporate the lessons learned.

Pertinent information is forwarded to the occupational medical department for their use in evaluating the workplace environment and/or hazards applicable to each employee.

Industrial Hygiene and Medical Workplace Hazard Evaluations

The basic elements of industrial hygiene and occupational medical workplace hazard evaluations at Program facilities include:

- Utilization of appropriate exposure limits established by the Navy Occupational Safety and Health (NAVOSH) program, Occupational Safety and Health Administration (OSHA), and American Conference of Governmental Industrial Hygienists (ACGIH) (references 5, 6, 8, and 9). In this regard, the Program continues to use OSHA limits established in 1989 despite a 1992 court decision which vacated these more protective exposure limits.

- Regular assessments of worksites by industrial hygiene and medical staff for the purpose of evaluating potential health hazards.

- Documented review of materials, processes, work practices and procedures used on specific jobs to determine hazard exposure potentials. These reviews determine specific job tasks that warrant routine or non-routine exposure monitoring, the use of personal protective equipment, or development of standardized work procedures to characterize and mitigate exposure to potential hazards.

- Establishment of workplace exposure monitoring programs which characterize potential hazard exposures during normal job activities throughout the facilities. Exposures are determined using standard exposure monitoring protocols as defined by the National Institute of Occupational Safety and Health (reference 10) and other recognized formats.

- Submittal of validated exposure data to the occupational medical staff for evaluation and incorporation into DOE facility personnel medical records. For Navy personnel, relevant exposure data is sent to the Naval branch medical clinic for inclusion in personnel medical records.

- Feedback to supervisory and management personnel on the results of employee exposure evaluations and monitoring so that procedure or process adjustments can be made if required.

- Medical examinations of personnel, based on potential exposures determined by the processes noted above.

Trend Analysis

Injury/illness documentation, medical records, and other records are reviewed frequently to ensure problem areas are identified and corrective actions are appropriate. At Program DOE facilities, injury and illness data for civilian personnel and subcontractors are compiled on a quarterly basis and submitted to the DOE. Accident reports for Naval personnel at DOE facilities and at the Moored Training Ship Facility are submitted to the Navy in accordance with NAVOSH requirements (references 5 and 6).

Analyzing trends is one of the most effective ways to identify problem areas and institute appropriate corrective measures to reduce accidents. Evaluations of each reportable occurrence are factored into continuous trend analysis by process/operation, type of injury/illness, or any other categorization needed to focus improvement actions at the true root causes. In addition, workers compensation records and medical clinic records provide supplemental accident history which may be used in reviewing injuries and illnesses. Following review, corrective actions (such as procedure revision, evaluation of work methods, additional training, and/or Hazard Analysis updating) are taken. Program facilities analyze even minor injury/illness events so that improvements may be implemented to prevent more serious injuries from occurring.

Critiques and Event Reporting

The Program evaluates and/or critiques significant events that actually or could potentially have caused injury to personnel. Critiques are formal evaluations of an event conducted by qualified individuals at each facility with Naval Reactors field office personnel in attendance. Facts pertinent to the event are documented, corrective actions established, and minutes are issued. For more serious events, and for events that have program wide significance, formal reports are issued and reviewed by Naval Reactors headquarters.

The Contractor Health and Safety Council conducts frequent teleconferences so that facilities may discuss health and safety events and the lessons learned from those events.

HAZARD CONTROL

OSHOM Manuals

All Naval Reactors Program facilities have written procedures which define programs to control potential safety and health hazards. These procedures are compiled into each individual facility's safety, industrial hygiene and occupational medicine manuals. Operations personnel prepare detailed written operating procedures and maintenance/repair manuals that incorporate safety and health procedures from these OSHOM manuals.

New Employee Indoctrination Training

Program facilities provide all new employees with occupational safety and health indoctrination training. This training includes facility safety instructions, procedures for reporting injuries and concerns, employee responsibilities, personal protective equipment, introduction to the organization of the facility's OSHOM program, and an overview of various facility emergency procedures.

Hazard Communication and Awareness Training

Hazard communication programs train workers to recognize work place hazards through chemical labeling, manufacturer's material safety data sheets, and discussions of hazards associated with certain job tasks or work areas. Hazard communication programs also train workers in the appropriate protective measures needed to minimize exposure to identified hazards.

In addition to hazard recognition training, awareness training is conducted to sensitize workers to look for and correct unsafe acts which could result in an injury. Awareness training emphasizes and reinforces that safe behavior will significantly reduce the chance of personal injury.

Continuous Training Programs

Training on OSHOM programs, as well as on many other aspects of each employee's job assignment, is regularly conducted at Program facilities. Continuing training provides knowledge on new requirements and ensures necessary skills and qualifications are maintained.

Navy Student and Instructor Training

Navy students and their instructors make up a large portion of the Program population at prototype sites and the majority of the population at the Moored Training Ship Facility in Charleston. The rigorous training and qualification program for all Naval nuclear propulsion plant operators includes key shipboard occupational safety and health requirements such as electrical safety, chemical use, gas-free engineering, emergency response actions, use of protective equipment, lock-out/tag-out, and other related safety requirements.

Informational Bulletins

Informational Bulletins, including DOE and Navy newsletters, training course schedules, defective materials notifications, and other sources of OSHOM news are distributed among Contractor Health and Safety Council members and the Naval Reactors field offices. This information enables each facility to remain up to date with the latest OSHOM developments and to pass this information on to facility personnel as needed. Each facility subscribes to a number of OSHOM publications.

Safety Representatives/Observers

Each Program facility has a safety representative or observer program. Safety representatives come from major departments and perform work area surveillance and submit written reports to work area management for improvement actions. These representatives also act as a conduit for other employees to express concerns. Suggestions of employees are actively solicited, evaluated, and, if appropriate, implemented. Representatives meet regularly to receive training, discuss concerns, and provide the OSHOM staff and operations management with recommendations for improvements to facility OSHOM programs.

Concern Reporting

All Naval Reactors facilities have a civilian employee concern management program in place (reference 3). Employee concern programs enable employees to raise safety and health concerns to the attention of management or occupational safety and health departments for corrective actions. Under these programs, employees may choose to anonymously report concerns. If the employee chooses not to report anonymously, the employee is informed of the status of corrective actions associated with the concern.

If an employee is not satisfied with the problem resolution, the concern will proceed to the next higher level of management. In the event that the employee is not satisfied with the resolution from the facility management chain, a procedure is in place to file concerns directly with Naval Reactors field office representatives. Employees may also bypass the management chain and file concerns directly with DOE.

Navy personnel concerns are handled within the military chain of command (reference 6).

Tracking and Follow-up Systems

All Program facilities have a systematic process for ensuring the timely resolution of safety and health issues. Safety and health hazards are corrected immediately, if possible, or stabilized to minimize associated hazards and then formally documented for tracking until final resolution. Open issues are tracked by prioritizing them on the basis of the hazard severity and appropriate time limits are assigned to complete corrective actions so all hazards are corrected in a timely manner.

Subcontractor Performance at Program Facilities

Each Program facility has procedures established for subcontractor work, including bidding and specification requirements, and ongoing oversight of subcontractor work. Subcontractors performing work at Program facilities are required by contract to comply with the same safety and health standards normally invoked at those facilities.

All subcontractors performing work at Program facilities are held responsible for the safety and health of their employees and subcontractors, and for taking corrective action on safety and health deficiencies resulting from subcontractor operations.

Subcontractor Worksite Overview

Subcontractors performing work at Program facilities are responsible for indoctrinating their personnel on all safety and health requirements, and any job specific requirements. The facility safety and health organization may assist in these indoctrinations. Each subcontractor is required to assign one of their employees as safety coordinator. For major subcontractors, full-time health, safety, and/or medical professionals may be required, and regular formal meetings between the subcontractor and various site organizations are held.

For each subcontract, there is a qualified facility employee who is responsible for day-to-day oversight and coordination of subcontractor operations. In addition to tracking the progress of the work, this individual is responsible for checking the adequacy of the subcontractor's safety and health programs. Each facility's safety and health organization also monitors the subcontractor's compliance by conducting inspections and assessments of work areas. Improvement actions are formally communicated to the subcontractor and tracked in the same manner as other corrective actions at the facility.

HEALTH EVALUATION, DIAGNOSIS, AND TREATMENT

The occupational medical programs at Program facilities are integrated into site operations to ensure adequate assessment of factors which affect personnel health and well being. Each facility's occupational medical program elements are documented in the respective site's occupational medical plan and include routine employee health examinations, as well as diagnosis and treatment of occupationally related injury and illness.

Employee Health Examinations

Routine health examinations are given to facility employees to provide initial and continuing health assessments in order to:

- Determine whether the employee's physical and mental health are compatible with the safe and reliable performance of assigned job tasks, including compliance with the Americans with Disabilities Act of 1990 (reference 11);
- Detect evidence of illness/injury and determine if there appears to be an occupational relationship; and
- Contribute to employee health maintenance by providing the opportunity for early detection, treatment, and prevention of occupationally related illnesses or injuries.

Comprehensive health examinations are conducted by a licensed physician or by an Occupational Health Examiner under the direction of a licensed physician, in accordance with current, sound, and accepted medical practices.

Routine health examinations/evaluations occur throughout an employee's career under the following circumstances:

- Preplacement Evaluations - Medical evaluations of job applicants are conducted prior to initial performance of job duties and, in the case of current employees, prior to a job transfer. The health status and fitness for duty of individuals is determined to ensure that assigned duties can be performed in a safe and reliable manner. Evaluations include review of applicable hazard analysis pertaining to the applicant/employee.
- Medical Surveillance Examinations and Health Monitoring - Special health examinations and health monitoring are conducted for employees who work in jobs involving specific physical, chemical, or biological hazards.
- Qualification Examinations - Examinations are conducted to qualify employees for job assignments for which specific medical qualification standards exist (e.g.,

special vehicle drivers, protective force personnel, and respirator wearers).

- Voluntary Periodic Examinations - Voluntary periodic examinations are offered to employees. A fundamental purpose of these examinations is to provide employees with a periodic assessment of their health. The frequency and type of examination offered is determined based on the individual's age and work exposures.

- Return to Work From Occupational Injury or Illness - All employees with occupationally-related injuries or illnesses are evaluated before returning to work. The scope of this evaluation is determined by the Occupational Health Examiner, based upon the nature and extent of the injury or illness, and is designed to ensure that the employee may return to work without undue health risk to self or others.

- Return to Work From Non-occupational Injury or Illness - Employees with significant non-occupationally-related injuries or illnesses are evaluated before returning to work. The scope of the evaluation is dependent upon the nature of the injury or illness, and is undertaken to ensure the employee can work without undue risk to self or others.

- Termination Health Evaluations - A health status review is available for all terminating employees. An examination is conducted, whenever possible, on employees with known occupational illnesses or injuries, documented or presumed exposures requiring evaluation by OSHA regulations (reference 8), or when more than one year has elapsed since the last examination.

Diagnosis and Treatment of Injury or Illness

All occupational injuries or illnesses, no matter how slight, are evaluated by medical personnel. Diagnosis and treatment of occupational injury or illness is prompt, with emphasis placed on rehabilitation and return to work at the earliest time compatible with employee health and job safety.

A close liaison exists between the medical and safety/health communities to ensure that the causes of occupational injuries or illnesses are fully evaluated and promptly acted upon.

Medical Services for Navy Personnel

Medical evaluation and care for Navy personnel is the responsibility of the local Naval hospital branch medical clinic. Immediate and emergency medical treatment for injuries or illnesses at DOE sites is provided by the facility medical staffs with immediate follow-up consultation with Navy medical personnel. If further diagnosis or treatment is warranted, the patient will be transported to nearby military or civilian medical facilities. Follow-up medical treatment or evaluation is provided by appropriate Naval medical services.

Communication between DOE prototype facility personnel and Naval medical staffs is coordinated through the Commanding Officer of the Nuclear Power Training Unit located at that facility. Navy medical staff visit the Program DOE facilities periodically and communicate directly with facility medical staff as appropriate to assist in proper diagnosis and treatment of Naval personnel.

At the Moored Training Ship Facility, personnel are served by a Navy sick-call clinic on-site and a larger clinic located elsewhere on the Charleston Naval Weapons Station site.

ACCOUNTABILITY

Independent Overview and Investigation

Naval Reactors field offices conduct frequent inspections and audits of OSHOM Programs to ascertain compliance with applicable requirements, to determine strengths and weaknesses, and to identify areas where improvement of the OSHOM programs is needed. These audits are complemented and augmented by a biennial program review by Naval Reactors headquarters personnel and representatives from other Naval Reactors field offices.

Additional oversight for Navy facilities is specified by OPNAV Instruction 5100.23 (reference 5). OPNAV Instruction 5100.23 assigns to the Navy Inspector General (NAVINSGEN) responsibility for conducting these oversight inspections which, for the Moored Training Ship Facility, would be conducted in consultation with Naval Reactors headquarters. While NAVINSGEN oversight inspections are normally conducted at locations determined to have the most severe safety and health problems, spot checks of other facilities are also conducted. Since its inception, no NAVINSGEN inspections have occurred at the Moored Training Ship Facility.

If significant safety or health events concerning civilian or Navy personnel at Program facilities occur, a formal independent investigation board is convened and includes senior personnel knowledgeable in the topical area and Naval Reactors Field Office or headquarters personnel (references 5,6 and 12). These investigations are categorized and typically involve several person-weeks of fact finding and evaluation effort.

General Accounting Office Evaluation

In the late 1980's allegations were made concerning environmental, health, and safety practices at some Program facilities. Allegations involved employee overexposure to radiation, unsafe reactor design, problems with asbestos work practices, and improper radioactive and hazardous waste disposal. In response to these allegations, the Chairman of the House Environment, Energy, and Natural Resources Subcommittee, House Committee on Government Operations in 1989 requested a comprehensive General Accounting Office review of the Program's environmental, safety, and health practices. The review of Program facilities focused on:

- Worker health and safety
- Radiological controls
- Reporting
- Environmental compliance

- Reactor Safety
- Adequacy of oversight
- Classification of information to prevent disclosure of problems

The GAO had unrestricted access to documents, facilities, and personnel within the Program, and talked in confidence with anyone who wished to discuss concerns during their fourteen month investigation. In 1991, following the review, the GAO testified in a joint hearing before the Department of Defense Nuclear Facilities Panel and the Seapower Subcommittee of the House Armed Services Committee.

In their testimony and report (references 13 and 14), the GAO stated the following:

"In the past we have testified many times before this Committee regarding problems in the Department of Energy. It is a pleasure to be here today to discuss a positive program in DOE."

"[W]e have reviewed the environmental, health, and safety practices at Naval Reactors laboratories and sites and have found no significant deficiencies."

"[W]e were given full and complete access to all classified and other information needed during our work. We reviewed thousands of classified documents and could find no trend or indication that information was classified to prevent public embarrassment."

"GAO's review of specific environmental and safety programs at Naval Reactors facilities show no basis for allegations that unsafe conditions exist there or that the environment is being adversely affected by activities conducted there."

Given the breadth and depth of the GAO review, their conclusion represents a strong independent endorsement of the excellence and effectiveness of OSHOM programs at Program facilities.

Internal Overview and Self Appraisals

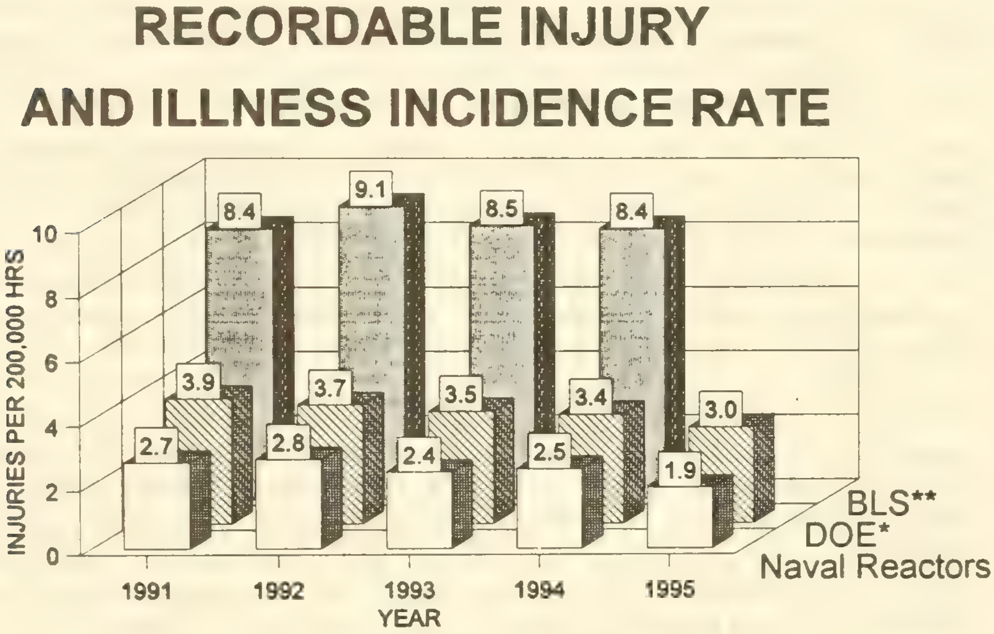
OSHOM organizations at each Program facility perform frequent and detailed inspections to determine the effectiveness with which OSHOM programs are implemented by operating personnel at the facility. Similarly, the OSHOM organizations perform self appraisals of their own activities and programs to identify areas where improvements are appropriate. The minimum acceptable standard of performance is full compliance with applicable rules, regulations, and standards as defined in the HSSRD.

MEASURES OF PERFORMANCE

The Naval Reactors Program facilities track numerous performance indicators to measure OSHOM effectiveness. The indicators used are consistent with those employed by general industry and the DOE. These indicators are developed using criteria established by the Bureau of Labor Statistics (BLS) in their Recordkeeping Guidelines (reference 15). The data provided for general industry, based on BLS criteria, is obtained from the Bureau of Labor Statistics (reference 16), and the National Safety Council (reference 17). The DOE data provided in this report is taken from the "Occupational Injury and Property Damage Summary" reports published quarterly by the DOE.

Fatalities

The Program has experienced no fatalities of civilian or military personnel resulting from current operations at its facilities for the five year period covered by this report and only three fatalities (all of which were subcontractor personnel) since the passage of the OSH Act in 1970. Two of the fatalities were due to falls and the third fatality was an individual who committed suicide while on-site.

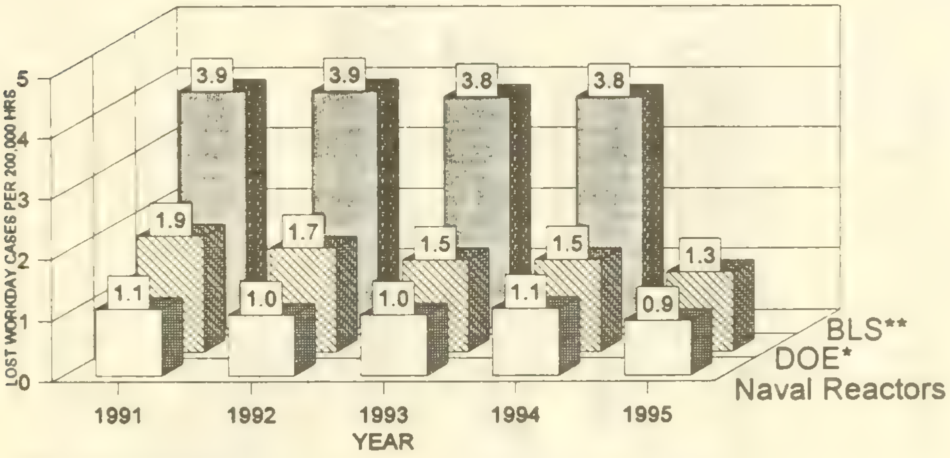


* Through Second Quarter 1995 **1995 BLS data unavailable

Figure 1

Recordable Injury and Illness Incidence Rate

The total recordable injury and illness incidence rates for the civilian work force in the Naval Reactors Program[1], DOE, and general industry (BLS) are shown in Figure 1. As shown by Figure 1, the Program's injury and illness rates have remained lower than the comparable DOE rates and substantially lower than the BLS total industry rates.



LOST WORKDAY CASE INCIDENCE RATES

* Through Second Quarter 1995 **1995 BLS data unavailable

Figure 2

Lost Workday Case Incidence Rate and Lost Workday Incidence Rate

The BLS recording criteria requires that all cases involving injuries or illnesses in the course of work that require treatment beyond first aid be recorded. The BLS injury and illness recording system, however, gives no indication of the severity of an injury or illness; it merely shows that an injury or illness has occurred. For example, a cut requiring sutures, a broken arm, or a disabling back injury are not distinguishable in the reporting system; each of these would be counted as one injury in the reported data.

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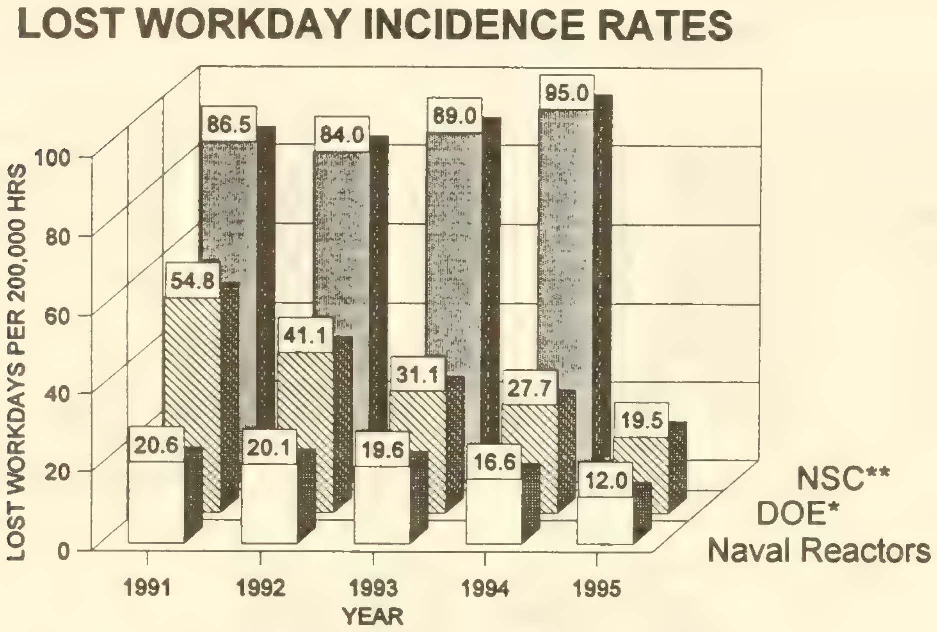
[1] Naval Reactors Program civilian work force data in Figures 1-4 includes data for civilian prime contractor and subcontractor personnel.

The severity of recordable cases is indicated by the number of cases which result in individuals losing time from work and by the number of days subsequently lost. Injuries and illnesses reported in the Program are generally minor in nature, such as cuts and abrasions, and require little or no time lost from work. Figure 2 shows the Naval Reactors Program, DOE, and general industry (BLS) rates of occupational injury or illness cases which resulted in individuals losing one or more workdays. Figure 2 shows that the Program lost workday case incidence rates are lower than the DOE rates and substantially lower than the BLS general industry rates.



* Through Second Quarter 1995 **1995 NSC data unavailable

Figure 3

Figure 3 shows the lost workday incidence rate, an indicator of the average number of workdays lost due to injuries and illnesses, and shows that the rate of lost workdays at Naval Reactors Program facilities is significantly below that of general industry and the DOE. The general industry rates are obtained from data published by the National Safety Council using BLS lost workday criteria.

Because significant differences exist between Navy injury and illness reporting criteria and the BLS criteria (i.e., the Navy has a higher threshold than that used by the BLS), combining civilian and military injury and illness data is not meaningful nor is a direct comparison of Navy performance indicators (reference 18) to DOE or BLS indicators. Therefore, the data for the Naval Reactors Program shown in Figures 1-3 do not include Navy personnel.

The Program tracks active duty Navy personnel injury and illness recordable case rates and lost workday case incident rates using the BLS criteria. For 1995, the injury and illness recordable incidence rate for Navy personnel at Program facilities, using the BLS criteria, was 1.3 per 200,000 hours worked. The lost workday case incidence rate was 0.6 cases that required one or more lost workdays per 200,000 hours worked.

If the higher Navy threshold for reporting injuries and illnesses is applied to Naval Reactors Program data (civilian and military personnel), the Program's performance is better than the overall Navy's.

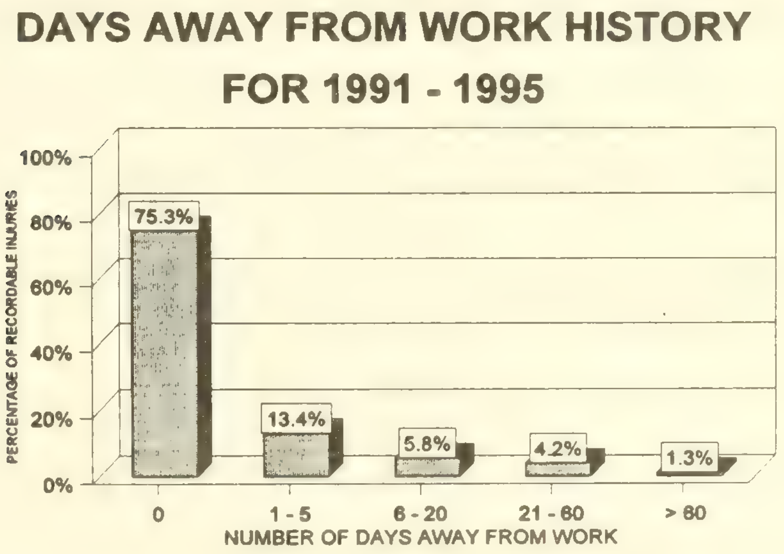


Figure 4

History of Cases Involving Days Away From Work

A further indication of Program injury and illness severity comes from a review of the history of cases resulting in days away from work (excluding cases with only restricted workdays). Figure 4 shows the Program's history of cases involving days away from work that were reported from 1991 to 1995 and the corresponding number of days lost. As shown in Figure 4, over 85% of the recordable injuries and illnesses resulted in either no days away from work or resulted in a relatively short period of time lost (less than 6 days).

Accident Investigations

Occupational illnesses or accidents involving injury of civilian or military personnel at Program DOE facilities are formally investigated by the Program. These events are categorized and investigated depending on the nature and severity of the occurrence. The DOE categorizes the most serious events, which require major action, as Type A, (i.e. a fatality) and Type B (i.e. serious injury requiring hospitalization). A third category, Type C, is for less serious events subject to routine investigation by contractor personnel (reference 12). A similar classification system exists in the Navy's NAVOSH program (references 5 and 6).

The Program has had no Type A or Type B events during the five years covered by this report. This compares to 49 Type A and Type B investigations for DOE operations during the same period.

REFERENCES

(1) U. S. Navy Report, "Occupational Radiation Exposure for U. S. Naval Nuclear Plants and Their Support Facilities - 1995," J. J. Mangeno and C. W. Burrows, NT-95-2, March 1995

(2) U. S. Department of Energy Report, "Occupational Radiation Exposure from Naval Reactors' Department of Energy Facilities," J. J. Mangeno and C. W. Burrows, NT-95-3, March 1995

(3) Department of Energy Order 5480.29; "Employee Concerns Management System"

(4) Presidential Executive order 12344, February 1, 1982; prescribed by Public Law 98-525 of October 19, 1984 (42 USC 7158, note.)

(5) OPNAV Instruction 5100.23; "Navy Occupational Safety and Health (NAVOSH) Program Manual"

(6) OPNAV Instruction 5100.19; "Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat"

(7) Department of Energy Order 5480.8; "Contractor Occupational Medical Program"

(8) Code of Federal Regulations Title 29 (Labor) Parts 1910; "Occupational Safety and Health Standards" and 1926; "Safety and Health Regulations for Construction"

(9) American Conference of Governmental Industrial Hygienists; "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices," Current Edition

(10) National Institute for Occupational Safety and Health; "NIOSH Manual of Analytical Methods"

(11) Americans with Disabilities Act of 1990; Title 1 "Employment Provisions"

(12) Department of Energy Order 5484.1; "Environmental Protection, Safety, and Health Protection Information Reporting Requirements"

(13) GAO/T- RCED-91-24; "Environmental, Health and Safety Practices at Naval Reactors Facilities," GAO Testimony

(14) GAO/RCED-91-157; "Environmental, Health and Safety Practices at Naval Reactors Facilities," GAO Report

(15) OMB Report No. 1220-0029; "Recordkeeping Guidelines for Occupational Injuries and Illnesses"

(16) National Safety Council: "Accident facts 1994 Edition"

(17) National Safety Council: "Accident facts 1992 Edition"; "Accident Facts 1993 Edition"; "Accident Facts 1994 Edition"; "Accident Facts 1995 Edition"

(18) U. S. Navy Report, "Report on the U.S. Navy Occupational Safety and Health Program Covering Fiscal Year 1995," Chief of Naval Operations, Safety and Occupational Health Branch

Report NT-96-3
March 1996

OCCUPATIONAL RADIATION EXPOSURE
FROM NAVAL REACTORS'
DEPARTMENT OF ENERGY FACILITIES

1995

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SUMMARY

The Naval Nuclear Propulsion Program is a joint Department of Energy (DOE) / Department of the Navy Program with central control by a single headquarters organization. Within the Department of Energy, the organization is designated as the Office of Naval Reactors and it operates two DOE laboratories, three other DOE Sites which have prototype Naval nuclear propulsion plants (one of these sites also operates the Expended Core Facility), and two nuclear component engineering and procurement organizations. Table 1 shows the facilities which conduct radioactive work associated with the Naval Reactors Program and the date when such work began. The Naval Reactors' Department of Energy facilities provide research and development, engineering, training, and supply support for the Navy's 96 nuclear-powered submarines and twelve nuclear-powered surface ships which were in operation at the end of 1995.

Radiation exposures to personnel monitored for radiation associated with Naval Reactors' Department of Energy facilities are summarized in this report. Also included in this report is radiation exposure information from the Shippingport Atomic Power Station, near Pittsburgh, Pennsylvania. Shippingport was developed by the Naval Reactors Program, in conjunction with Duquesne Light Company, as the world's first full-scale atomic power plant solely for the production of electricity, and began operation in 1957. Starting in 1974, the light water breeder reactor (LWBR) core was installed at Shippingport; this was the first reactor to prove that fuel breeding was possible in a water cooled plant. Shippingport was shut down in 1982 and turned over to another office of the Department of Energy for dismantlement in 1984. Dismantlement was completed in 1989, removing all radioactive components and returning the site to unrestricted use.

Figure 1 shows that the total radiation exposure in 1995 is less than one twentieth the amount in the peak year of 1975 and the number of personnel monitored has decreased by more than one half since 1975. The large increase in radiation exposure in 1975 was due to refueling operations at one of the prototype Naval nuclear propulsion plants and to fabrication and installation of the LWBR core at Shippingport. LWBR was unique in this sense because the core was manufactured at one of the Naval Reactors Program laboratories (other cores were manufactured by subcontractors) and the fissile material was uranium-233 rather than uranium-235. Total man-rem in this figure is the sum of the annual exposure of each person monitored for radiation.

No personnel at the Naval Reactors' Department of Energy facilities have ever exceeded the applicable Federal annual exposure limit. The annual limit was 15 rem per year in 1958 and is currently 5 rem per year. Since 1973 no one has exceeded the

Federal limit of 3 rem per quarter year established in 1960; prior to 1973, fourteen people at Naval Reactors' Department of Energy facilities exceeded this level. Thirteen of these individuals received exposures less than one rem above the limit, and the remaining individual received 8.1 rem in a quarter. No one has exceeded the Program's limit of 5 rem per year since this limit was established in 1967.

The average occupational exposure of each person monitored at the Naval Reactors' Department of Energy facilities is approximately one eighth of a rem per year. The lifetime accumulated exposure from radiation associated with the Naval Reactors' Department of Energy facilities to date for all personnel monitored has averaged about one rem per person.

According to the standard methods for estimating risk, the risk to the group of personnel occupationally exposed to radiation associated with the Naval Reactors Program is less than the risk these same personnel have from exposure to natural background radiation or to medical radiation. This risk is small compared to the risks accepted in normal industrial activities, and it is small compared to the risks regularly accepted in daily life outside work.

TABLE 1

INITIAL LABORATORY AND PROTOTYPE OPERATIONS

Location	Year Initial Operations Began Involving Radioactive Work
Bettis Atomic Power Laboratory West Mifflin, Pennsylvania	1950
Knolls Atomic Power Laboratory Schenectady, New York	1950[1]
Naval Reactors Facility Idaho Falls, Idaho	1953
Kenneth A. Kesselring Site Ballston Spa, New York	1955
Windsor Site Operation Windsor, Connecticut	1959
Shippingport Atomic Power Station[2] Beaver Falls, Pennsylvania	1957
Westinghouse Plant Apparatus Division Monroeville, Pennsylvania	N/A[3]
Westinghouse Machinery Apparatus Operation Schenectady, New York	N/A[3]

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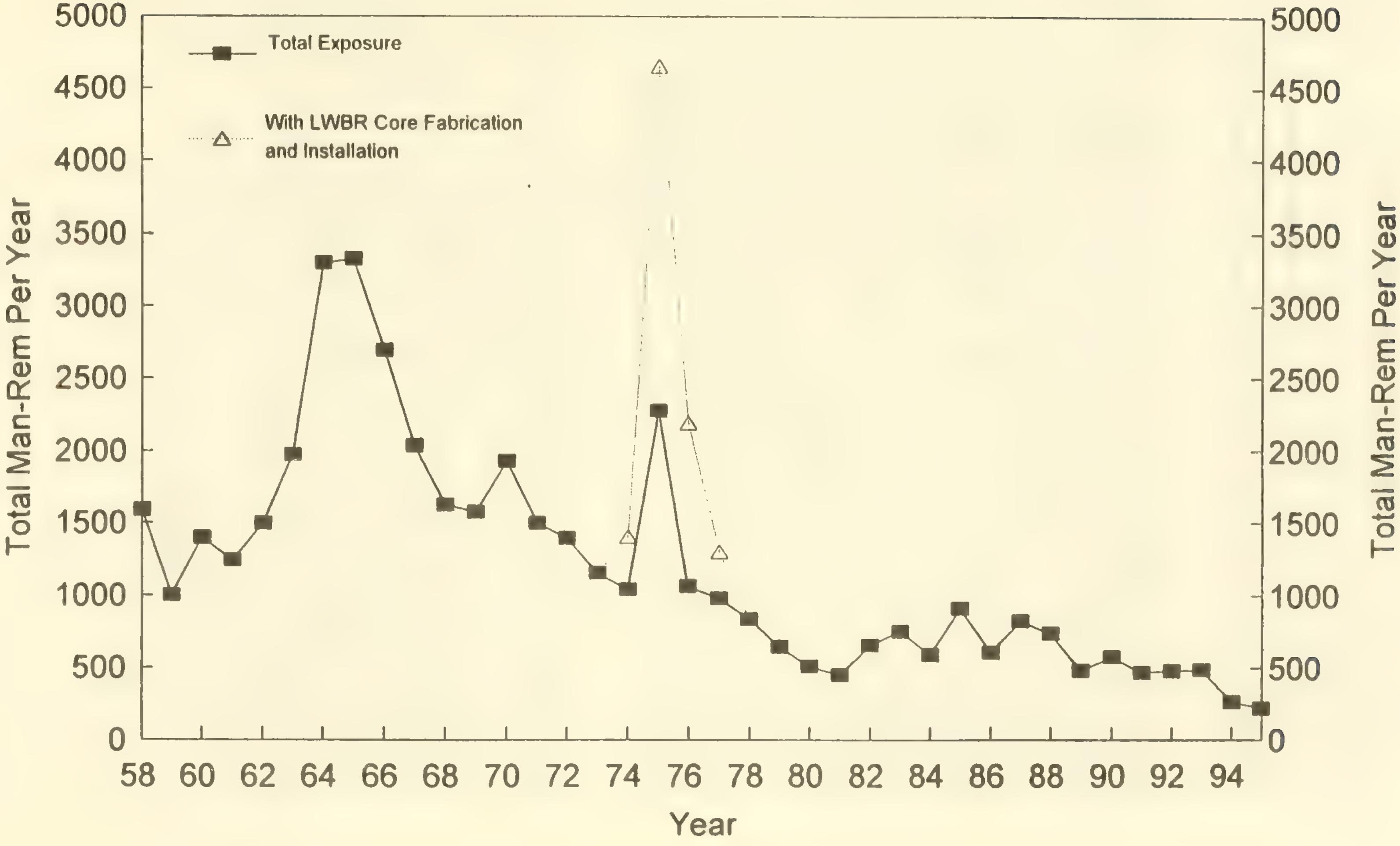
[1] Naval Reactors Program work began at Knolls Atomic Power Laboratory in 1950. Non-Naval Reactors Program isotope separations process research work was performed at Knolls on behalf of the Atomic Energy Commission from 1947 through 1953.

[2] Shippingport Atomic Power Station was shut down in 1982 and turned over to another office of the Department of Energy for dismantlement in 1984. Dismantlement was completed in 1989.

[3] No work involving radioactive materials is performed at either the Westinghouse Plant Apparatus Division or the Westinghouse Machinery Apparatus Operation. The small amount of radiation exposure received by personnel at these facilities is the result of visits to other Program facilities. Westinghouse Machinery Apparatus Operation was formerly operated by General Electric.

FIGURE 1
TOTAL RADIATION EXPOSURE RECEIVED BY PERSONNEL AT NAVAL REACTORS' DEPARTMENT OF ENERGY FACILITIES 1958 - 1995



EXTERNAL RADIATION EXPOSURE

Policy and Limits

The policy of the Naval Reactors Program is to reduce to as low as reasonably achievable exposure to personnel from ionizing radiation associated with Naval Reactors' Department of Energy facilities.

Prior to 1960, the radiation exposure limit used in the U. S. for whole body radiation was 15 rem[1] per year. Since 1960, the radiation exposure limits used in the U. S. for whole body radiation exposure have been 3 rem per quarter year and 5 rem accumulated dose for each year beyond age eighteen. These limits were recommended in 1958 by the U. S. National Committee ("Committee" was changed to "Council" when the organization was chartered by the U. S. Congress in 1964) on Radiation Protection and Measurements (ref 1)[2] and by the International Commission on Radiological Protection (ref 2). They were adopted by the U. S. Atomic Energy Commission (AEC) and applied both within the AEC and to licensees in 1960 (ref 3). The U. S. Federal Radiation Council recommendation that these limits be used as guidance for Federal agencies was approved by President Eisenhower on May 13, 1960 (ref 4). A key part of each of these standards has been emphasis on minimizing radiation exposure to personnel.

In 1965 the International Commission on Radiological Protection (ref 5) reiterated the quarterly and accumulated limits cited above but suggested that exceeding 5 rem in one year should be infrequent. Although none of the other organizations referred to above changed its recommendations accordingly, the Naval Reactors Program adopted 5 rem per year as a rigorous limit effective in 1967.

In 1971 the National Council on Radiation Protection and Measurements (ref 6) recommended that 5 rem be adopted as the annual limit under most conditions. In 1974 the Atomic Energy Commission (now Department of Energy) (ref 7) established 5 rem as its annual limit. In 1977 the International Commission on Radiological Protection (ref 8) deleted the accumulated limit and recommended 5 rem as the annual limit. In 1979, the Nuclear Regulatory Commission (NRC) issued a proposed change to the Code of Federal Regulations Title 10, Part 20 to require its licensees to use 5 rem as an annual limit. On January 20, 1987, revised guidance for Federal agencies was approved by President Reagan which eliminated the accumulated dose limit discussed above and established a 5 rem per year limit for occupational radiation exposure (ref 9). The Nuclear Regulatory Commission has revised the Code of Federal Regulations, Title 10, Part 20 making the 5 rem annual limit effective on January 1, 1994.

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[1] 1 rem = 0.01 Sievert

[2] References are listed on pages 57 through 60.

The Naval Reactors Program Exposure Limits since 1967 have been:

3 rem per quarter year
5 rem per year

Special limits are in effect such as for hands and feet; however, there have been few cases where these limits have been more restrictive than the whole body radiation exposure limits. Therefore, the radiation exposures discussed in this report are nearly all from whole body radiation. Controls are also in effect to minimize any occupational radiation exposure to the unborn child of a pregnant worker.

Each of the Naval Reactors' Department of Energy facilities is required to have an active program to reduce radiation exposure to the minimum practicable.

Sources of Radiation at Prototypes

One of the Naval Reactors Department of Energy sites operates prototype Naval nuclear propulsion plants (Kesselring Site Operation located near Ballston Spa, New York). This facility is engaged in the testing of nuclear propulsion plants for the U.S. Navy and the training of U.S. Navy propulsion plant operators. The other two sites (Windsor Site Operation near Windsor, Connecticut; and the Naval Reactors Facility on the Idaho National Engineering Laboratory (INEL) site near Idaho Falls, Idaho) have prototype plants which are currently being inactivated. The Naval Reactors Facility also houses the Expended Core Facility (ECF). Personnel at the ECF receive, examine, and prepare spent Naval fuel modules for transfer to the Idaho Chemical Processing Plant. ECF also examines the Naval Reactors Program's irradiated material samples from the INEL's Test Reactor Area.

The radiation exposures at the prototype sites originate primarily from pressurized water reactors. Water circulates through a closed piping system to transfer heat from the reactor core to a secondary steam system isolated from the reactor cooling water. Trace amounts of corrosion and wear products are carried by reactor coolant from reactor plant metal surfaces. Some of these corrosion and wear products are deposited on the reactor core and become radioactive from exposure to neutrons. Reactor coolant carries some of these radioactive products through the piping systems where a portion of the radioactivity is removed by a purification system. Most of the remaining radionuclides transported from the reactor core deposit in the piping systems.

The reactor core is installed in a heavy-walled pressure vessel within a primary shield. This shield limits radiation exposure from the gamma and neutron radiation produced when the reactor is at power. Reactor plant piping systems are installed primarily inside a reactor compartment which is surrounded by a secondary shield. Access to the reactor compartment is permitted only after the reactor is shut down. Most radiation exposure to personnel comes from inspection, maintenance and repair inside the reactor compartment. The major source of this radiation is cobalt-60 deposited inside the piping systems. Cobalt-60 emits two high energy gamma rays and a low energy beta particle for every radioactive decay. Its half-life is 5.3 years.

Neutrons produced when reactor fuel fissions are shielded by both primary and secondary shields before penetrating to occupied areas. Radiation exposure to personnel from these neutrons during reactor operation is much less than from gamma radiation. After reactor shutdown, when maintenance and other support work is done, no neutron exposure is detectable. As a result, the radiation exposures at prototypes are primarily from gamma radiation.

Radiation exposure at the Expended Core Facility is also due to gamma radiation emitted by irradiated reactor fuel and structural components which were inside the reactor vessel during operation and became radioactive by exposure to neutrons. Work on these components is performed remotely in either specially designed shielded cells or in deep water pits where many feet of water shield personnel.

Exposures listed in this report for prototype personnel include Department of Energy employees and contractors as well as exposure to Navy staff and students involved in training at the sites.

Sources of Radiation at Laboratories

The two Naval Reactors' laboratories (Bettis Atomic Power Laboratory located near Pittsburgh, Pennsylvania and Knolls Atomic Power Laboratory near Schenectady, New York) conduct research and development work on improved nuclear propulsion plants for U. S. Navy warships. At the laboratories, external radiation exposure is attributable to examination and analysis of irradiated materials and fuel. Gamma radiation is the significant contributor to dose. Although alpha and beta radiation are present, they are generally well shielded. Neutron radiation contributes very little to doses at the laboratories.

Irradiated materials include mixed fission products and activation products. The activation products are identical to those discussed in the preceding section. Fission products are the radioactive species produced by the fissioning of nuclear fuel. Fission products generally emit both beta and gamma radiation and have half lives ranging from hours to many years. In cases where these materials emit significant levels of radiation, the analyses and examinations are performed remotely using special tooling in shielded cells similar to those used at the Expended Core Facility. With regard to fuel, the preparation of fuel specimens involves the handling of unirradiated uranium. The dose rates from these materials are generally low. Irradiated fuel specimens are handled in the shielded cells.

Radiation exposures for the Shippingport Atomic Power Station are also included under the heading for laboratory personnel. The sources of radiation exposure at Shippingport are similar to those at the prototype sites. From 1974 to 1977, the Bettis Atomic Power Laboratory fabricated and installed the Light Water Breeder Reactor (LWBR) core for Shippingport. The fissile fuel for this core was uranium-233 and the fertile fuel was thorium-232. Enriched uranium-233 contains a significantly higher level of uranium-232 than enriched uranium-235. The radioactive decay chain of uranium-232, in turn, includes thallium-208 which emits a high energy gamma ray with each decay; accordingly, the radiation exposure of personnel fabricating the LWBR core was much higher than for fabrication of traditional uranium-235 cores. In addition to fabrication, there was also significant radiation exposure due to LWBR installation inside the Shippingport power plant.

Also included under the laboratory heading is the small amount of exposure to personnel assigned to the two Naval Reactors' Department of Energy nuclear component engineering and procurement organizations (the Westinghouse Plant Apparatus Division located near Monroeville, Pennsylvania and the Westinghouse Machinery Apparatus Operation near Schenectady, New York). In 1995, personnel at these facilities received about 2.4 man-rem of occupational radiation exposure. Since no radioactive material is handled at these facilities, this exposure is the result of visits to other Naval Reactors Program activities where nuclear-powered ships are built and maintained.

Control of Radiation

Reactor plant shielding is designed to minimize radiation exposure to personnel. Shield design criteria establishing radiation levels in various parts of each prototype are personally approved by the Director of the Naval Nuclear Propulsion Program. The Director of the Naval Nuclear Propulsion Program also personally approved the shield design criteria for the Shippingport Atomic Power Station.

Prototype design is also controlled to keep locations, such as duty stations where personnel need to spend time, as far as practicable away from the reactor compartment shield. In addition, radiation outside propulsion plant spaces during reactor plant operation is not generally any greater than natural background radiation.

Laboratories and prototype sites are designed so that radioactive material outside of reactor plants is handled only in specially designed and shielded facilities. The Naval Reactors' Department of Energy facilities limit to the minimum the number of places where radioactive material is allowed. Specific traffic routes are required to be used for any movement of radioactive material outside these facilities. A radioactive material accountability system is used to ensure no radioactive material is lost or misplaced in a location where personnel could unknowingly be exposed. Regular inventories are required for every item in the radioactive material accountability system. Radioactive material is tagged with yellow and magenta tags bearing the standard radiation symbol and the measured radiation level. Radioactive material is required to be placed in yellow plastic, and the use of yellow plastic is reserved solely for radioactive material. All personnel assigned to Naval Reactors' Department of Energy facilities are trained to recognize that yellow plastic identifies radioactive material and to initiate immediate action if radioactive material is discovered out of place.

Access to radiation areas is controlled by posted signs and barriers. Personnel are trained in the access requirements, including the requirement to wear dosimetry devices to enter these areas. Dosimetry devices are also posted near the boundaries of these areas to verify that personnel outside these areas do not require monitoring. Frequent radiation surveys are required using instruments which are checked before use and calibrated regularly. Areas where radiation levels are greater than 0.1 rem per hour are called high radiation areas and are locked or guarded. Compliance with radiological controls requirements is checked frequently by radiological controls personnel and by other personnel not affiliated with the radiological controls organization.

Dosimetry

Thermoluminescent dosimeters (TLD's) are dosimetry devices worn by personnel to measure their exposure to gamma, neutron, and beta radiation. Prior to 1975, film badges were used as described in detail below. The TLD's used at the prototypes contain two chips of calcium fluoride with added manganese. The TLD's used at the laboratories contain four chips of lithium fluoride. It is characteristic of thermoluminescent material that radiation causes internal changes which make the material, when subsequently heated, give off an amount of light directly proportional to the radiation dose.

Since the types of radiation to which personnel are exposed are different at the laboratories than at the prototypes, the design of the dosimeters is also different. At the prototypes, the source of radiation exposure is high energy gamma radiation, whereas at the laboratories and the Expended Core Facility, high and low energy gamma radiation and beta radiation are present. Shippingport used dosimeters similar to the ones used at the prototypes. At all facilities, separate TLD's are used for the few applications where neutron monitoring is required.

The calcium fluoride TLD's used at the prototypes are designed such that the two calcium fluoride chips are in contact with a metallic heating strip with heater wires extending through the ends of a surrounding glass envelope. The glass bulb is protected by a plastic case designed to permit the proper response to gamma radiation of various energies. The lithium fluoride TLD's used at the laboratories and the Expended Core Facility are designed such that the four lithium fluoride chips are encapsulated in teflon and mounted into pre-drilled holes in an aluminum card.

The processing, that is reading, of the calcium fluoride TLD's is performed manually. A trained operator removes the glass bulb from the plastic case and places it in a TLD reader so that the metal heater wires contact an electrical circuit. An electronically controlled device heats the calcium fluoride chips to several hundred degrees centigrade in a timed cycle, and the intensity of light emitted is measured and converted to a digital readout in units of rem. The heating cycle also anneals the calcium fluoride chips so that the dosimeter is zeroed and ready for subsequent use. The entire cycle of reading a TLD described here takes about thirty seconds.

The processing of the laboratories' lithium fluoride TLD's is performed automatically, that is, the operator can load as many as 1400 lithium fluoride cards into the reader and the TLD reader automatically reads one TLD card at a time. To read the radiation exposure from the lithium fluoride TLD's, a trained operator removes the aluminum cards from the plastic cases and places them into cartridges which are loaded into the microprocessor-controlled TLD reader. To start the read process, one TLD card is automatically removed from the cartridge and positioned into the read position where the bar code identification number is read. The four chips are then simultaneously heated to several hundred degrees centigrade using four precisely temperature-controlled streams of hot nitrogen gas. During the heating of the TLD's, the lithium fluoride TLD's (like the calcium fluoride TLD's) give off light in proportion to the radiation they received. The light is converted to a graphical and digital readout as well as digitally stored on a microcomputer hard disk. This heating cycle also anneals the TLD chips so that the dosimeter is zeroed and ready for subsequent use. After readout, the TLD is then automatically moved to an unload cartridge. The entire read cycle for one card takes, on the average, 30 seconds. After processing, the computer converts the light output to dose in units of rem.

The rapid readout of the calcium fluoride and lithium fluoride TLD's was one reason for changing from film badges to TLD's. Processing film badges was a time consuming chemical process; the use of TLD's permits more frequent measurement of a worker's radiation exposure than film badges. TLD's are processed at least quarterly, and for those individuals who are expected to receive higher exposures, at least monthly. In addition, for those individuals who enter a reactor compartment, the TLD's are processed daily.

To ensure accuracy of the TLD systems, several periodic calibration and accuracy checks are performed. For example, all TLD's are checked when new. In addition the lithium fluoride TLD's are checked, at a minimum, once a year for accurate response to known exposures, and the calcium fluoride TLD's are checked, at a minimum, once every six months. The calcium fluoride TLD readers are calibrated once a year to verify accuracy by one of several calibration facilities having precision radiation sources directly traceable to the National Institute of Standards and Technology (NIST) and precision TLD standards. The lithium fluoride readers are calibrated to a local source at least once a week, and to a calibration source directly traceable to NIST every two years. In addition, checks on the readers are performed daily and during the reading of TLD's to ensure proper reader operation and accuracy utilizing both an internal electronic standard which is built into each reader and quality control dosimeters which have been exposed to a known exposure level.

In addition to these calibrations and checks, the laboratories and prototypes have an independent quality assurance program to monitor the accuracy of TLD's and the TLD readers in use. TLD's are pre-exposed to exact amounts of radiation by NIST or one of the laboratories and provided to the prototype and/or laboratory for reading. To assure objectivity, the prototype or laboratory being tested is not told of the radiation values to which each dosimeter has been exposed. The results are then compared to the actual exposures. Any inaccuracies found by these tests that exceed established permissible error bands result in appropriate corrective action such as recalibration of a failed TLD reader. In addition, the laboratories participate in nationwide intercomparison studies as they are conducted. The results of this program demonstrate that the radiation to which personnel are exposed is being measured by the TLD system with an average error of less than 10%.

Pocket ionization chambers with an eyepiece permit the wearer to read his own radiation exposure. This pocket dosimeter is required in addition to a TLD when entering a reactor compartment or other high radiation area. Pocket dosimeters are used to enable the wearer to keep track of his own radiation exposure during a work period. The official record of radiation exposure is obtained from the TLD.

Dosimetry devices are worn on the trunk of the body, normally at the waist or chest. In some special situations dosimeters are worn at other locations, for example on the hands or fingers or head.

Any discrepancies that occur between TLD and pocket dosimeter measurements are investigated. These investigations include making independent estimates of the worker's exposure using such methods as time spent in the specific radiation area and comparing the estimates with the TLD and pocket dosimeter measurements to determine which measurement is most accurate.

In 1975, the conversion from film badges to TLD's for measuring radiation exposure was completed. Prior to this time film packets like those used for dental x-rays were placed in holders designed to allow differentiating between types of radiation. The darkness of the processed film was measured with a densitometer and converted to units of radiation exposure. When the first personnel radiation exposures were measured by Naval Reactors' Department of Energy facilities, there already was widespread photodosimetry experience and precise procedures existed to provide reproducible results.

Each film badge was clearly marked with a name or number corresponding to the individual to whom it was assigned. In high radiation areas every worker also wore a pocket dosimeter which was read when the worker left the area. At the end of each month when the film badges were processed, the film badge measurements were compared with the sum of the pocket dosimeter readings.

For approximately 20 years, neutron monitoring at the Naval Reactors' Department of Energy facilities was performed using neutron film badges. These facilities now use lithium fluoride TLD's to monitor neutron exposure of the few personnel exposed to neutron sources such as for radiation instrument calibration and for reactor plant instrumentation source handling. These measured neutron exposures have been included with gamma radiation exposures in the total whole body radiation exposure discussed in this report, but because neutron exposures are so low, the radiation exposures in this report are nearly all from gamma radiation.

Because personnel at the laboratories can be exposed to both gamma and beta radiation, beta monitoring has been routinely performed using film badges or lithium fluoride TLD's. Monitoring for beta radiation is not normally required at the prototypes because beta radiation does not penetrate the metal boundaries of the reactor coolant system. Beta radiation needs to be considered in maintenance or repair operations at the prototypes only when systems are opened and personnel are close to surfaces which have been contaminated with radioactive corrosion products from reactor coolant. In cases where shielding such as clothing or eyeglasses or plastic contamination control materials can be used to completely shield out the beta radiation, personnel are not monitored for beta radiation. In those cases where the beta radiation cannot be shielded, prototype personnel are monitored with lithium fluoride TLD's provided by the laboratories.

Monitoring for personnel external exposure due to alpha radiation is not performed. Alpha radiation does not penetrate past the dead layer of a person's skin and, therefore, does not contribute to an individual's external radiation dose.

Physical Examinations

Radiation medical examinations have been required since the beginning of operations by the Naval Reactors' Department of Energy facilities for personnel occupationally exposed to radiation. These examinations are conducted in accordance with standard protocols. In these examinations the doctor pays special attention to any condition which might medically disqualify a person from receiving occupational radiation exposure or pose a health risk or safety hazard to the individual or their co-workers, or detrimentally affect the safety of the workplace. Passing this examination is a prerequisite for obtaining dosimetry which permits entry to areas where radiation exposure can be received. For military personnel who have already been screened by physical examinations, few fail this radiation medical examination. For civilian workers, the failure rate is a few percent. However, failure of this examination does not mean a worker will not have a job. Since workers spend most of their time performing non-radioactive work, inability to qualify for radioactive work does not restrict their job opportunities. No worker at Naval Reactors' Department of Energy facilities has been released for inability to pass a radiation medical examination.

Radiation medical examinations are given prior to initial radiation work, periodically thereafter, and at termination of radioactive work in the Naval Reactors Program (or at termination of employment). The periodic examinations are conducted in accordance with the following frequencies:

Age	Interval
18-24	Pre-placement
25-49	5 years
50-59	2 years
≥60	1 year

A radiation medical examination includes a review of medical history to determine, among other subjects, past radiation exposure, history of cancer, history of radiation therapy, and family history of cancer. In the medical examination, particular attention is paid to evidence of cancer or a precancerous condition. Laboratory procedures include urinalysis, blood analysis, and comparison of blood constituents to a specific set of standards. In the event an evaluation determines that an individual is disqualified, the individual is restricted from receiving occupational radiation exposure.

Radiological Controls Training

Periodic radiological controls training is performed to ensure each person understands the general and specific radiological conditions which he might encounter, understands his responsibility to the Naval Reactors Program and the public for safe handling of radioactive materials, understands the risks associated with radiation exposure and understands his responsibility to minimize his own radiation exposure. Training is also provided on the biological risk of radiation exposure to the unborn child. Prior to being authorized to perform radioactive work, an employee is required to complete satisfactorily a radiological controls training course, including a written examination. A typical course for workers ranges from 16 to 32 hours. In written examinations on radiological controls, short answer questions, such as multiple choice and true-false questions, are prohibited. The following are the minimum training requirements for workers:

1. Radiation Exposure Control:

    a. State the limits for whole body penetrating radiation. Explain that the rem is a unit of biological dose from radiation.

    b. Discuss the importance of the individual keeping track of his/her own exposure. Know how to obtain year-to-date exposure information.

    c. Know that local administrative control levels are established to maintain personnel radiation exposure as low as reasonably achievable. Know your own exposure control level and who can approve changes to this level.

d. Discuss procedures and methods for minimizing exposure such as working at a distance from a source, reducing time in radiation areas, and using shielding.

e. Know that a worker is not authorized to move, modify, or add temporary shielding without specific authorization.

f. Discuss potential sources of radiation associated with work performed by the individual's trade.

g. Discuss the action to be taken if an individual loses dosimetry equipment while in a posted radiation or high radiation area.

h. Discuss how to obtain and turn in dosimetry equipment.

i. Know that thermoluminescent dosimetry equipment is required to be worn on the portion of the individual's body that receives the highest exposure and that pocket dosimeters are worn at the same location on the body as the thermoluminescent dosimetry. Know that only radiological controls personnel can authorize movement of dosimetry equipment from areas of the body where dosimetry is normally worn (such as the chest or waist) to other areas of the body.

j. Be aware of the seriousness of violating instructions on radiation warning signs and unauthorized passage through barriers.

k. Explain how "stay times" are used.

l. Know that Naval nuclear work at a facility has no significant effect on the environment or on personnel living adjacent to the facility.

m. Explain the risk associated with personnel radiation exposure. Know that any amount of radiation exposure, no matter how small, might involve some risk; however, exposure within accepted limits represents a risk that is small compared with normal hazards of life. The National Council on Radiation Protection and Measurements has stated that while exposures of workers and the general population should be kept to the lowest practicable levels at all times, the presently permitted exposures limit the risk to a reasonable level in comparison to nonradiation risks. Know that cancer is the main potential health effect of receiving radiation exposure. Know that any amount of radiation exposure to the unborn child, no matter how small the exposure, might involve some risk; however, exposure of the unborn child within accepted limits represents a risk that is small when compared with other risks to the unborn child. Know that the risk to future generations (genetic effect) is considered to be even smaller than the cancer risk and that genetic effects have not been observed in humans.

n. Know how often an individual shall read his/her pocket dosimeter while in a posted high radiation area. Know that worker shall leave a posted high radiation area when his/her pocket dosimeter reaches three quarters scale or when a preassigned exposure is reached, whichever is lowest.

o. Know that stay times and predetermined pocket dosimeter readings are assigned when working in radiation fields of 1 rem/hour or greater. Know that the worker shall leave the work area when either the assigned stay time or pocket dosimeter reading is reached.

2. Contamination Control:

a. Discuss how contamination is controlled during radioactive work (e.g., containment in plastic bags and use of contamination containment areas). Explain that these controls limit exposure to internal radioactivity to insignificant levels.

b. Discuss how contamination is detected on personnel.

c. Discuss how contamination is removed from objects and personnel.

d. Discuss potential sources of contamination associated with work performed by the individual's trade.

e. State the beta-gamma surface contamination limit. Discuss the meaning of the units of the limit.

f. Explain what radioactive contamination is. Explain the difference between radiation and radioactive contamination.

g. For personnel who are trained to wear respiratory protection equipment, state the controls for use of such equipment. State the limits for airborne particulate radioactivity.

h. Discuss the required checks to determine whether personnel contamination monitoring equipment is operational prior to conducting personnel monitoring. Discuss the action to be taken if the checks indicate the equipment is not operating properly.

i. Discuss the actions to be taken if personnel contamination monitoring equipment alarms while conducting personnel monitoring.

j. Discuss the procedure to package and remove a contaminated item from a controlled surface contamination area.

k. Know that no health effects are expected from receiving radioactive contamination associated with Naval nuclear propulsion plants on the skin.

3. Accountability of Radioactive Materials: Know that radioactive materials are accounted for when transferred between radiologically controlled areas by tagging, by tracking location, and through the use of radioactive material escorts.

4. Waste Disposal:

   a. Discuss how individual workers can reduce the amount of radioactive liquid and solid waste generated for the specific type of duties performed.

   b. Discuss the importance of proper segregation of non-contaminated, potentially contaminated, and contaminated material.

   c. Know what reactor plant reuse water is. Discuss the appropriate uses of reactor plant reuse water.

5. Radiological Casualties:

   a. Discuss the need for consulting radiological controls personnel when questions or problems occur. Understand the importance of complying with the instructions of radiological controls personnel in the event of a problem involving radioactivity.

b. Discuss procedures to be followed in the event of a spill of material (liquid or solid) which is or might be radioactive.

c. Discuss procedures to be followed when notified that airborne radioactivity is above the limit.

d. Discuss procedures to be followed in the event a high radiation area is improperly controlled.

e. Discuss actions to be taken when an individual discovers his/her pocket dosimeter is off-scale or has recorded a higher reading than expected.

6. Responsibilities of Individuals: Discuss actions required in order to fulfill workers' responsibilities. Discuss the responsibility of the individual to notify his/her employer of medical radiation therapy, medical diagnosis involving radioisotopes, open wounds or lesions, physical conditions which they feel affects their qualification to receive occupational radiation exposure, or occupational radiation exposure from past or current outside employment. Discuss the responsibility of the individual to report to area supervision or radiological controls personnel any condition that might lead to or cause avoidable exposure to radiation.

7. Practical Ability Demonstrations: These demonstrations are performed on a mock-up.

a. Demonstrate the ability to read all types of pocket dosimeters used by the organization.

b. Demonstrate the proper procedure for donning and removing a full set of anticontamination clothing.

c. Demonstrate the proper procedures for entering and leaving a high radiation area, a radiologically controlled area, and a control point area, including proper procedures for self-monitoring. Demonstrate the ability to read and interpret posted radiation and contamination survey maps.

d. Demonstrate the ability to properly package and remove an item from a controlled surface contamination area.

e. Demonstrate action to be taken by one or two workers in the event of a spill of radioactive liquid.

f. For personnel who will enter or remain in areas where respiratory protection equipment is required, demonstrate the proper procedure for donning and removing the type of respiratory equipment the individual will be required to wear in conjunction with anticontamination clothing. In addition, individuals who are trained to wear air-fed hoods demonstrate the proper response to take if supply air is lost while wearing an air-fed hood.

g. For personnel who are trained to work in contamination containment areas, demonstrate the proper procedures for working in these areas. This demonstration includes a pre-work inspection, transfer of an item into the area, a work evolution in the area, and transfer of an item out of the area.

In addition to passing a written examination, completion of this training course requires satisfactory performance during basic types of simulated work operations. For an employee to continue as a radiation worker, he is required to requalify in a manner similar to the initial qualification at least every two years. Between these qualification periods, personnel are selected at random for additional written and practical work operation examinations to assess their retention of knowledge and practical abilities. Training is also conducted by individual shop instructors in the specific job skills for radiation work within each trade. For complex jobs this is followed by special training for the specific job, frequently using mock-ups outside radiation areas.

Radiological controls technicians are required to complete a course of six months to one year in length in radiological controls, to demonstrate their practical abilities in work operations and drills and to pass comprehensive written and oral examinations. Radiological controls supervisors are required to have at least the same technical knowledge and abilities as the technicians; however, passing scores for supervisors' examinations are higher or supervisors' examinations are more difficult than for technicians. Oral examinations are conducted by radiological controls managers and senior supervisors and require personnel to be able to evaluate symptoms of unusual radiological controls situations. The radiological controls technician or supervisor is required to evaluate initial conditions, state immediate corrective action required, state what additional measurements are required, and perform a final analysis of the measurements to identify the specific problem. Subsequent to qualification, periodic training sessions are required in which each radiological controls technician and supervisor demonstrates their continued ability to handle situations such as are used in the oral examinations. At least every two and one half years, radiological controls personnel must requalify through written and practical abilities examinations similar to those used for initial qualification. Additionally, their first requalification includes an oral examination similar to the one required for initial qualification. Between these qualification periods, radiological controls technicians and supervisors are selected at random for additional written and practical work operation examinations to assess their retention of knowledge and practical abilities. They also participate in unannounced drills.

In addition to the above training for those who are involved in radioactive work, each Naval Reactors' Department of Energy facility employee not involved in radioactive work and each person assigned to a prototype (e.g., for training) is required to receive basic radiological training which is repeated at least annually. This training is to ensure personnel understand the posting of radiological areas, the identification of radioactive materials, and not to cross radiological barriers. This instruction also explains that the radiation environment of personnel outside radiation areas and outside the facility is not significantly affected by nuclear work.

Nuclear Power Training

Prior to being assigned to a prototype Naval nuclear propulsion plant for training, military and civilian personnel are required to pass a six month basic training course at the Navy's Nuclear Power School in Orlando, Florida. While at Nuclear Power School and continuing while at the prototype, these personnel receive extensive radiological controls training including lectures, demonstrations, practical work, radiological controls drills, and written and oral examinations. This training emphasizes the ability to apply basic information on radiation and radioactivity.

Prior to becoming qualified as the Shift Supervisor of a Naval nuclear propulsion prototype plant, that is, the senior contractor supervisor on each shift who is responsible for the timeliness and quality of all training conducted by personnel assigned to his crew, the Shift Supervisor candidate must pass several 8-hour written examinations and a sequence of oral examinations. A key part of these qualification examinations is radiological controls.

Before serving as Plant Manager of a Naval nuclear propulsion prototype plant, the prospective plant manager attends a three month course at the Naval Reactors Program headquarters. The radiological controls portion of this course covers advanced topics and assumes the individual starts with detailed familiarity with Naval nuclear propulsion plant radiological controls. The prospective plant manager must pass both written and oral examinations in radiological controls during this course prior to assuming the position of plant manager of a Naval nuclear propulsion prototype plant.

Radiation Exposure Reduction

Maintaining personnel radiation exposures as low as reasonably achievable involves all levels of management at the Naval Reactors' Department of Energy facilities. Operations, maintenance, and repair personnel are required to be involved in this subject; it is not left solely to radiological controls personnel. To evaluate the effectiveness of radiation exposure reduction programs, managers use a set of goals. Goals are set in advance to keep each worker's exposure under certain levels and to minimize the number of workers occupationally exposed to radiation. Goals are also set on the total cumulative personnel radiation exposure (man-rem) for each major job and for the whole year. These goals are deliberately made difficult to meet in order to encourage personnel to improve performance.

Of the various goals used, the most effective in reducing personnel radiation exposure has been the use of exposure control levels which are lower than the program's quarterly and annual limits. Control levels at the Naval Reactors' Department of Energy facilities range from 0.1 rem to 2 rem for the year, depending on the amount of radioactive work scheduled, whereas 5 rem per year is the annual Program limit.

To achieve the benefits of lower control levels in reducing total man-rem, it is essential to minimize the number of workers permitted to receive radiation exposure. Otherwise the control levels could be met merely by adding more workers. Organizations are required to conduct periodic reviews to ensure the number of workers is the minimum for the work that has to be performed.

The following is a synopsis of the checklist which has been in use for years in maintaining personnel radiation exposure as low as reasonably achievable during radiological work.

Preliminary Planning

- Plan in advance
- Delete unnecessary work
- Determine expected radiation levels

Preparation of Work Procedures

- Plan access to and exit from work area
- Provide for service lines (air, welding, ventilation, etc.)

- Provide communication (sometimes includes closed-circuit television)
- Remove sources of radiation
- Plan for installation of temporary shielding
- Decontaminate
- Work in lowest radiation levels
- Perform as much work as practicable outside radiation areas
- State requirements for standard tools
- Consider special tools
- Include inspection requirements (these identify steps where radiological controls personnel must sign prior to work proceeding)
- Minimize discomfort of workers
- Estimate man-rem

Temporary Shielding

- Control installation and removal by written procedure
- Inspect after installation
- Conduct periodic radiation surveys
- Minimize damage caused by heavy lead temporary shielding
- Balance radiation exposure received in installation against exposure to be saved by installation
- Shield travel routes
- Shield components with abnormally high radiation levels early in the maintenance period
- Shield position the worker occupies
- Perform directional surveys to improve design of shielding by locating sources of radiation
- Use mock-up to plan temporary shielding design and installation

Rehearsing and Briefing

- Rehearse
- Use mock-up duplicating working conditions
- Use photographs
- Brief workers

Performing Work

- Post radiation levels
- Keep excess personnel out of radiation areas
- Minimize beta radiation exposure (anticontamination clothing effectively shields most beta radiation)

- Supervisors and workers keep track of radiation exposure
- Workers assist in radiation and radioactivity measurements
- Evaluate use of fewer workers
- Reevaluate reducing radiation exposures

Since its inception, the Naval Reactors Program has stressed the reduction of personnel radiation exposure. Measures that have been taken to reduce exposure include standardization of procedures, development of new tooling, improved use of shielding, and compliance with strict contamination control measures. For example, most work involving radioactive contamination is performed in total containment. This practice minimizes the potential for spreading contamination and thus reduces work disruptions, simplifies working conditions, and minimizes the cost and exposure to clean up.

Lessons learned during radioactive work and new ways to reduce exposure developed at one organization are made available for use by other organizations in the Naval Reactors Program. This effort allows all of the organizations to take advantage of the experience and developments at one organization and minimizes duplication of effort.

The extensive efforts that have been taken to reduce exposure at Naval Reactors' Department of Energy facilities have also had other benefits, such as reduced cost to perform radioactive work and improved reliability. Efforts such as detailed work planning, rehearsing, containment, special tools and standardization have resulted in increased efficiency and better access to perform maintenance with the overall result that reliability is improved and costs are reduced.

Radiation Exposure Data

The total occupational radiation exposure received by all personnel at the Naval Reactors' Department of Energy facilities in 1995 was 225 man-rem. Tables 2 and 3 summarize radiation exposure received at the Naval Reactors' Department of Energy facilities since 1958.

Figure 1 (on page 4) shows graphically the total occupational radiation exposure received at the Naval Reactors' Department of Energy facilities. The data shows major increases in the total man-rem exposures in the years 1964 through 1966 and 1975. In 1964 through 1966 the increase in the exposures was primarily due to an increase in reactor plant overhaul and refueling efforts. In 1975, the increase was also primarily due to increased overhaul and refueling work; in addition, as noted in the footnote to Table 2, increased occupational exposure occurred in 1974 through 1977 associated with a civil project, the fabrication and installation of the light water breeder reactor (LWBR) at the Shippingport Atomic Power Station. LWBR work was unique because the core was manufactured at Bettis Atomic Power Laboratory (other cores are manufactured by subcontractors) and the fuel was uranium-233 rather than uranium-235. In addition to fabrication, there was also significant radiation exposure due to LWBR installation inside the Shippingport power plant.

Decreases in total annual exposures, numbers of personnel monitored, and numbers of personnel with annual exposures over 2 rem have been achieved as a result of continuing efforts to reduce radiation exposures to the minimum practicable. Since 1979, the total annual exposure for the laboratories has averaged slightly under 50 man-rem and for all of the prototype sites has averaged less than 550 man-rem.

Since a worker usually is exposed to radiation in more than one year, the total number of personnel monitored cannot be obtained by adding the annual numbers. The total number of personnel monitored for radiation exposure associated with the Naval Reactors' Department of Energy facilities is about 146,000 (including the over 94,000 Navy personnel trained as Naval nuclear propulsion plant operators at the prototype sites). Table 4 provides further information about the distribution of their radiation exposures. In 1995, about 99 percent of those monitored for radiation received less than 0.5 rem in a year. Since 1958, the average exposure per year for each person monitored has been 0.12 rem which is less than the 0.30 rem average annual exposure a person receives from natural background radiation (including the inhalation of radon) (ref 10).

Table 4 also lists the numbers of personnel who have exceeded the 3 rem quarterly exposure limit. The total number of persons who have exceeded the quarterly limit since the limit was imposed in 1960 is fourteen. Thirteen of the fourteen personnel had quarterly exposures in the range of 3 to 4 rem, and the person with the highest exposure received 8.1 rem in a quarter; no one has exceeded the quarterly limit since 1973. In none of these cases did personnel exceed the Federal accumulated limit of 5 rem for each year of age over eighteen (5(N-18), which was also established in 1960). Standard procedures require any person who receives greater than 25 rem in a short time period to be placed under medical observation. No one at the Naval Reactors' Department of Energy facilities has reached this level. Since it was established in 1967, no one has exceeded Naval Reactors' limit of 5 rem per year for radiation associated with the Naval Reactors Program.

For the years 1958 to 1995, the average annual exposure per person is 0.12 rem. The average lifetime accumulated radiation exposure for the 146,000 personnel who have been monitored at the Naval Reactors' Department of Energy facilities is about 0.34

rem. Although they account for a significant fraction of the radiation exposure received at the prototype sites each year, the over 94,000 Navy personnel trained to date receive a small percentage of their lifetime exposure at the prototype sites. The bulk of their exposure is received later in their Navy careers; therefore, their accumulated dose is not representative of the lifetime exposure received by personnel permanently assigned to these facilities. If the Navy trainees are subtracted from the total number of personnel monitored, the average lifetime accumulated exposure from radiation associated with Naval Reactors' Department of Energy facilities is approximately one rem. This radiation exposure is much less than the exposure the average American receives from natural background radiation or from medical diagnostic x-rays during his working lifetime (ref 10).

TABLE 2

OCCUPATIONAL RADIATION EXPOSURE RECEIVED BY PERSONNEL MONITORED AT NAVAL REACTORS' LABORATORIES

	Number of Persons Monitored Who Received Exposures in the Following Ranges of Rem for the Year						Total Personnel Monitored	Total Man-Rem[1]
Year	0-1	1-2	2-3	3-4	4-5	>5[2]		
1958	1923	74	15	20	8	31	2071	762
1959	2050	94	21	16	4	0	2185	586
1960	2056	105	43	14	4	3	2225	581
1961	3717	120	57	27	9	4	3934	671
1962	3956	67	38	13	3	1	4078	414
1963	5124	135	47	27	6	1	5340	647
1964	5195	265	135	127	52	23	5797	1854
1965	5586	188	36	33	2	0	5845	977
1966	4493	105	36	12	3	1	4650	600
1967	5006	120	52	34	13	0	5225	668
1968	4958	96	44	29	16	0	5143	606
1969	5589	72	49	42	26	0	5778	754
1970	6346	99	61	39	47	0	6592	819
1971	7378	109	48	32	5	0	7572	646
1972	7000	138	41	17	2	0	7198	626
1973	6867	68	7	0	0	0	6942	368
1974	7568	96	28	1	1	0	7694	221[3]
1975	4719	290	151	57	68	0	5285	280[3]
1976	5304	371	88	0	0	0	5763	219[3]
1977	4639	81	5	0	0	0	4725	201[3]
1978	3609	10	0	0	0	0	3619	143
1979	3367	4	0	0	0	0	3371	100
1980	3330	0	0	0	0	0	3330	78
1981	2510	0	0	0	0	0	2510	72
1982	2672	0	0	0	0	0	2672	82
1983	2717	6	0	0	0	0	2723	93
1984	2933	1	0	0	0	0	2934	67
1985	2338	4	0	0	0	0	2342	59
1986	2261	0	0	0	0	0	2261	35
1987	2189	0	0	0	0	0	2189	27
1988	2029	0	0	0	0	0	2029	31
1989	2108	0	0	0	0	0	2108	31
1990	2228	0	0	0	0	0	2228	28
1991	2216	0	0	0	0	0	2216	28
1992	2162	0	0	0	0	0	2162	25
1993	2066	0	0	0	0	0	2066	22
1994	1894	0	0	0	0	0	1894	25
1995	1824	0	0	0	0	0	1824	22

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[1] Data for 1958 - 1962 does not include exposure information for personnel monitored at the Shippingport Atomic Power Station. Data is not available in summary format.

[2] Limit for the Naval Reactors' Department of Energy facilities was changed to 5 rem per year in 1967.

[3] Total man-rem for 1974 through 1977 does not include exposure received as part of fabrication and installation of the Light Water Breeder Reactor core at the Shippingport Atomic Power Station. If this exposure is included the totals become 588, 2660, 1354, and 524, respectively.

TABLE 3

OCCUPATIONAL RADIATION EXPOSURE RECEIVED BY PERSONNEL MONITORED AT NAVAL REACTORS' PROTOTYPES

	Number of Persons Monitored Who Received Exposures in the Following Ranges of Rem for the Year						Total Personnel Monitored	Total Man-Rem[1]
Year	0-1	1-2	2-3	3-4	4-5	>5[2]		
1958	2415	83	77	50	27	3	2655	833
1959	2390	63	18	3	1	0	2475	420
1960	2558	126	40	28	2	2	2756	822
1961	2600	79	42	13	2	0	2736	576
1962	3653	185	45	20	8	4	3915	1090
1963	4354	270	74	29	12	0	4739	1332
1964	4940	203	102	65	16	2	5328	1446
1965	5595	267	110	80	73	58	6183	2351
1966	5765	311	145	81	39	7	6348	2099
1967	6409	241	72	35	12	0	6769	1372
1968	6564	172	69	5	0	0	6810	1026
1969	5713	188	57	9	0	0	5967	827
1970	5748	215	82	12	0	0	6057	1113
1971	5499	148	26	1	0	0	5674	856
1972	7634	116	3	0	0	0	7753	773
1973	7518	181	28	0	0	0	7727	791
1974	8427	109	20	9	3	0	8568	824
1975	7515	270	131	98	83	0	8097	1998
1976	8282	145	19	0	0	0	8446	845
1977	8813	101	17	2	0	0	8933	782
1978	8890	157	1	0	0	0	9048	698
1979	9908	64	0	0	0	0	9972	546
1980	9818	11	0	0	0	0	9829	433
1981	9679	2	0	0	0	0	9681	381
1982	10464	25	0	0	0	0	10489	576
1983	10816	77	0	0	0	0	10893	660
1984	8694	13	0	0	0	0	8707	525
1985	9136	127	0	0	0	0	9263	851
1986	8122	35	0	0	0	0	8157	576
1987	9021	47	0	0	0	0	9068	798
1988	8328	43	0	0	0	0	8371	707
1989	7261	12	0	0	0	0	7273	451
1990	6548	73	0	0	0	0	6621	549
1991	6369	57	0	0	0	0	6426	444
1992	5301	125	0	0	0	0	5426	458
1993	4934	133	0	0	0	0	5067	466
1994	4368	16	0	0	0	0	4384	241
1995	3641	0	0	0	0	0	3641	203

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[1] Data for 1958 - 1971 does not include Combustion Engineering personnel monitored at the Windsor Site Operation who did not become employees of the General Electric Corporation when operation of the Windsor Site was transferred from Combustion Engineering to General Electric.

[2] Limit for the Naval Reactors' Department of Energy facilities was changed to 5 rem per year in 1967.

TABLE 4

NAVAL REACTORS' DEPARTMENT OF ENERGY FACILITIES DISTRIBUTION OF PERSONNEL RADIATION EXPOSURE

Year	Average Rem Per Person Monitored[1]		Percent of Personnel Monitored Who Received Greater Than 1 Rem[1]		Number of Personnel Who Exceeded 3 Rem/Quarter
	Prototype	Laboratory	Prototype	Laboratory	
1958	0.31	0.37	9.0	7.1	0
1959	0.17	0.27	3.4	6.2	0
1960	0.30	0.26	7.2	7.6	1
1961	0.21	0.17	5.0	5.5	0
1962	0.28	0.10	6.7	3.0	1
1963	0.28	0.12	8.1	4.0	0
1964	0.27	0.32	7.3	10.4	2
1965	0.38	0.17	9.5	4.4	1
1966	0.33	0.13	9.2	3.4	1
1967	0.20	0.13	5.3	4.2	1
1968	0.15	0.12	3.6	3.6	0
1969	0.14	0.13	4.3	3.3	0
1970	0.18	0.12	5.1	3.7	5
1971	0.15	0.09	3.1	2.6	1
1972	0.10	0.09	1.5	2.8	0
1973	0.10	0.05	2.7	1.1	1
1974	0.10	0.08	1.6	1.6	0
1975	0.25	0.50	7.2	10.7	0
1976	0.10	0.23	1.9	8.0	0
1977	0.09	0.11	1.3	1.8	0
1978	0.08	0.04	1.7	0.3	0
1979	0.05	0.03	0.6	0.1	0
1980	0.04	0.02	0.1	0.0	0
1981	0.04	0.03	0.0	0.0	0
1982	0.05	0.03	0.2	0.0	0
1983	0.06	0.03	0.7	0.2	0
1984	0.06	0.02	0.1	0.0	0
1985	0.09	0.03	1.4	0.2	0
1986	0.07	0.02	0.4	0.0	0
1987	0.09	0.01	0.5	0.0	0
1988	0.08	0.02	0.5	0.0	0
1989	0.06	0.01	0.2	0.0	0
1990	0.08	0.01	1.1	0.0	0
1991	0.07	0.01	0.9	0.0	0
1992	0.08	0.01	2.3	0.0	0
1993	0.09	0.01	2.6	0.0	0
1994	0.05	0.01	0.3	0.0	0
1995	0.06	0.01	0.0	0.0	0
Average	0.12	0.12	2.5	3.1	
Overall Average	0.12		2.7		

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[1] Laboratory data for 1958 - 1962 does not include exposure information for personnel monitored at the Shippingport Atomic Power Station. Data is not available in summary format. Prototype data for 1958 - 1971 does not include Combustion Engineering personnel monitored at the Windsor Site Operation who did not become employees of the General Electric Corporation when operation of the Windsor Site was transferred from Combustion Engineering to General Electric.

Table 5 provides information on the distribution of lifetime accumulated exposures for all personnel who were monitored in 1995 for radiation exposure associated with the Naval Reactors' Department of Energy facilities.

TABLE 5

LIFETIME RADIATION EXPOSURE ASSOCIATED WITH NAVAL REACTORS' DEPARTMENT OF ENERGY FACILITIES

Range of Accumulated Lifetime Radiation Exposures	Percentage of Personnel Monitored in 1995 With Lifetime Accumulated Radiation Exposure Within that Range
0 - 5 Rem	94.35
5 - 10 Rem	3.75
10 - 15 Rem	1.06
15 - 20 Rem	0.47
20 - 30 Rem	0.25
30 - 40 Rem	0.08
40 - 50 Rem	0.04
> 50 Rem	0.00

The radiation exposure limits used in the U. S. until the recent changes to the Code of Federal Regulations, Title 10, Part 20 limited an individual's lifetime exposure to 5 rem for each year beyond age eighteen. With the recent changes, lifetime exposure is not specifically limited, but is controlled as the result of the annual limit of 5 rem. In their most recent radiation protection recommendations, the National Council on Radiation Protection and Measurements (NCRP) encourages organizations to control lifetime accumulated exposure to less than 1 rem times the person's age (ref 11). Among all personnel monitored in 1995, there is currently no worker with a lifetime accumulated exposure greater than the NCRP recommended level of 1 rem times their age from radiation associated with the Naval Reactors Program.

INTERNAL RADIOACTIVITY

Policy and Limits

Naval Reactors' policy on internal radioactivity for personnel associated with the Naval Reactors' Department of Energy facilities continues to be the same as it was more than three decades ago - to prevent significant radiation exposure to personnel from internal radioactivity. The limits invoked to achieve this objective are one-tenth of the levels allowed by Federal regulations for radiation workers. Since 1972, no one has received more than one-tenth the Federal annual internal occupational exposure limit from internal radiation exposure caused by radioactivity associated with work at the Naval Reactors' Department of Energy facilities.

Prior to 1972, two individuals had internal depositions between 50 and 80% of the Maximum Permissible Lung Burden (MPLB), and three individuals had internal depositions ranging from 10% to 50% of the MPLB;[1] no one had a deposition which exceeded the MPLB. The MPLB is the level of radioactivity retained in the individual's lung which would result in an exposure to the person's lung equal to the dose limit for the lung of 15 rem per year if the radioactivity level remained constant throughout the year. Additionally, one individual received a very high localized exposure to his ear drum in 1955 as a result of a fine particle of radioactive material which became lodged in his ear canal for approximately nine days. Although there is no explicit limit for radioactivity deposited in a person's ear, this case resulted in partial hearing loss. This case is discussed further on page 50.

As discussed above for the lungs, the basic Federal limit for radiation exposure to organs of the body from internal radioactivity has been 15 rem per year. There have been higher levels applied at various times for the thyroid and for bones; however, use of these specific higher limits has not been necessary at the Naval Reactors' Department of Energy facilities.

Fifteen rem per year was the limit recommended for most organs of the body by the U. S. National Committee on Radiation Protection and Measurements in 1954 (ref 1), by the U. S. Atomic Energy Commission in the initial edition of ref (3) applicable in 1957, and by the International Commission on Radiological Protection in

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[1] One Knolls Atomic Power Laboratory individual was reported to the Department of Energy in 1982 as exceeding 50% of the maximum permissible lung burden (MPLB) for the year 1969. In 1988, the Laboratory reassessed this case. This assessment found the original internal monitoring analysis, performed by a subcontractor, had a systematic high bias. Taking this high bias into account, the 1988 assessment was that no intake greater than 10% of the MPLB had occurred.

1959 (ref 2), and was adopted for Federal agencies when President Eisenhower approved recommendations of the Federal Radiation Council May 13, 1960.

In 1977 the International Commission on Radiological Protection revised its recommendations (ref 8), particularly regarding internal exposure. The new recommendations provided a method of combining, and controlling, exposure from internal radioactivity with exposure from external radiation. The effect of the 1977 recommendations was to raise the allowable dose to many organs, with no organ allowed to receive more than 50 rem in a year. In conjunction with these recommendations, more recent knowledge on the behavior and effect of internal radioactivity was used to derive new limits for control of internal radioactivity (ref 12). The Federal guidance approved by President Reagan in 1987 adopted these revised recommendations and methods (ref 9).

Sources of Radioactivity at Prototypes

Radioactivity can get inside the body through air, through water or food, and through surface contamination via the mouth, skin, or a wound. The radioactivity of primary concern at the prototypes is the activated metallic corrosion products on the inside surfaces of reactor plant piping systems. These are in the form of insoluble metallic oxides, primarily iron oxides. Reference 13 contains more details on why cobalt-60 is the radionuclide of most concern for internal radioactivity.

The design conditions for reactor fuel are much more severe for warships than for commercial power reactors. Naval nuclear propulsion prototype plants are built to the same high standards as nuclear-powered warships. As a result of being designed to withstand shock, Naval reactor fuel elements retain fission products including fission gases within the fuel. Sensitive measurements are made frequently to verify the integrity of reactor fuel. Consequently, fission products such as strontium-90 and cesium-137 make no measurable contribution to internal exposure of personnel from radioactivity associated with Naval nuclear propulsion prototype plants. Similarly, alpha emitting radioisotopes such as uranium and plutonium are retained within the fuel elements and are not accessible to personnel operating or maintaining a Naval nuclear propulsion prototype plant.

Because of the high integrity of reactor fuel and because soluble boron is not used in reactor coolant for normal reactivity control in Naval nuclear propulsion prototype plants, the amounts of tritium in reactor coolant are far less than in typical commercial power reactors. The small amounts that are present are formed primarily as a result of neutron interaction with the deuterium naturally present in water. The radiation from tritium is of such low energy that the Federal limits for breathing or swallowing tritium are more than three hundred times higher than for cobalt-60. As a result, radiation exposure to personnel from tritium is far too low to measure. Similarly, the low energy beta radiation from carbon-14, which is formed in small quantities in reactor coolant systems as a result of neutron interactions with nitrogen and oxygen, does not add measurable radiation exposure to personnel operating or maintaining Naval nuclear propulsion prototype plants.

At the Expended Core Facility, the radioactivity of primary concern is radionuclides associated with irradiated nuclear fuel. Highly trained, specialized personnel perform examinations and evaluations of the reactor cores removed from nuclear-powered submarines, surface ships, and prototype plants. These evaluations are performed to obtain important technical data to verify and improve the design of nuclear cores. Although the quantity of radioactive material handled is large, advanced personnel radiological training, radiological engineering designs (e.g., shielded cells and special handling equipment), and radiological monitoring programs (e.g., air monitoring systems) prevent any significant internal exposure.

Sources of Radioactivity at Laboratories

The radionuclides of primary concern at the laboratories are those associated with the nuclear fuel process; these include the fuel itself (uranium-234, uranium-235, and uranium-238) and the principal fission products (strontium-90 and cesium-137). Radioactivity with more restrictive limits than the above radionuclides (e.g., thorium and plutonium) is also present at the laboratories, but only in isolated and specially controlled operations. Highly trained, specialized personnel perform experimental design and testing of new fuel systems as well as verifying the integrity of existing materials. Laboratory personnel handle only small quantities of fuel. The small quantities handled coupled with advanced personnel radiological training, radiological engineering designs (e.g. containment boxes), and radiological monitoring programs (e.g. air monitoring systems) prevent any significant internal exposure.

Residues of the radionuclides described above are present at low levels in some laboratory equipment and facilities which were used for radioactive work in the past. Radiological cleanup is being undertaken to remove these radioactive materials. This effort is performed in a carefully controlled manner; the radiological controls techniques followed during this work (e.g., special radiological training, formal procedures, radiological engineering designs) have proven to be effective in preventing any significant internal exposure.

Control of Airborne Radioactivity

Airborne radioactivity is controlled during routine operations such that respiratory equipment is not normally required. To prevent exposure of personnel to airborne radioactivity, contamination containment tents, bags, or boxes are used. These containments are ventilated to the atmosphere through high efficiency filters which have been designed and tested to remove at least 99.95 percent of particles of a size comparable to cigarette smoke. Radiologically controlled areas such as reactor compartments are also required to be ventilated through high efficiency filters any time work which could cause airborne radioactivity is in progress. Airborne radioactivity surveys are required to be performed regularly in radioactive work areas. Any time airborne radioactivity above the limit is detected in occupied areas, work which might be causing airborne radioactivity is stopped. This conservative action is taken to minimize internal radioactivity even though the Naval Reactors' airborne radioactivity limit would allow continuous breathing for forty hours per week throughout the year to reach an annual exposure of one-tenth the Federal limit. Personnel are also trained to use respiratory equipment when airborne radioactivity above the limit is detected. However, respiratory equipment is seldom needed and is not relied upon as the first line of defense against airborne radioactivity.

It is not uncommon for airborne radioactivity to be caused by radon naturally present in the air. Atmospheric conditions such as temperature inversions can allow the buildup of radioactive particles from radon to occur. Radon can also build up in sealed or poorly ventilated rooms in homes or buildings made of stone or concrete, or it can migrate from the underlying ground. Most cases of airborne radioactivity above Naval Reactors' conservative airborne radioactivity limit in occupied areas have been caused by radon and not from prototype plant or laboratory operations. Procedures have been developed to reduce the radon levels when necessary and allow work to continue after it has been confirmed that the elevated airborne radioactivity is from naturally occurring radon.

Control of Radioactive Surface Contamination

Perhaps the most restrictive regulations in the Naval Reactors Program's radiological controls program are established in the requirements for the control of radioactive contamination. Work operations involving potential for spreading radioactive contamination use containments to prevent personnel contamination or generation of airborne radioactivity. The controls for radioactive contamination are so strict that precautions sometimes have had to be taken to prevent tracking contamination from fallout and natural sources into radiological areas because the contamination control limits used in these areas were below the levels of fallout and natural contamination occurring outside in the general public areas.

Anticontamination clothing, including coveralls, hood (to cover the head, ears and neck), shoe covers and gloves, is provided when needed. However, the basic approach is to avoid the need for anticontamination clothing by containing the radioactivity. As a result, most work on radioactive materials is performed with hands reaching into gloves installed in containments, making it unnecessary for the worker to wear anticontamination clothing. In addition to providing better control over the spread of radioactivity, this method has reduced radiation exposure since the worker can usually do his job better and faster in his normal work clothing. A basic requirement of contamination control is monitoring all personnel leaving any area where radioactive contamination could possibly occur. Workers are trained to survey themselves (i.e., frisk), and their performance is checked by radiological controls personnel. Frisking of the entire body is required upon leaving an area with radioactive surface contamination, normally using sensitive hand-held survey instruments. Major work facilities are equipped with portal monitors, which are used in lieu of hand-held friskers. Personnel monitor before, not after, they wash. Therefore, washing or showering at the exit of radioactive work areas is not required. The basic philosophy is to prevent contamination, not wash it away.

Surveys for radioactive contamination are taken frequently by trained radiological controls personnel. Results of these surveys are reviewed by senior personnel to provide a double-check that no abnormal conditions exist. The instruments used for these surveys are checked against a radioactive calibration source daily and prior to use, and they are calibrated at least every six months.

Control of Food and Water

Smoking, eating, drinking and chewing are prohibited in radioactive areas. By prohibiting these hand to mouth contacts, the possibility of internal contamination is reduced even further.

Wounds

Skin conditions or open wounds which might not readily be decontaminated are cause for temporary or permanent disqualification from doing radioactive work. Workers are trained to report such conditions to radiological controls or medical personnel, and radiological controls technicians watch for open wounds when workers enter radioactive work areas. In the initial medical examination prior to radiation work and during subsequent examinations, skin conditions are also checked. If the cognizant local medical officer determines a wound is sufficiently healed or considers the wound is adequately protected, he may remove the temporary disqualification.

There have been only a few cases of contaminated wounds at the Naval Reactors' Department of Energy facilities. In most years, none occur. Examples of such injuries which have occurred in the past include a scratched hand, a metallic sliver in a hand, a cut finger, and a puncture wound to a hand. These wounds occurred at the same time the person became contaminated. Insoluble metallic oxides which make up the radioactive contamination remain primarily at the wound site rather than being absorbed into the blood stream. Most contaminated wounds have been promptly and easily decontaminated.

Monitoring for Internal Radioactivity at Prototypes

The radionuclide of most concern for internal radiation exposure from Naval nuclear propulsion prototype plants is cobalt-60. Although most radiation exposure from cobalt-60 inside the body will be from beta radiation, the gamma radiation given off makes cobalt-60 easy to detect. Complex whole body counters are not required to detect cobalt-60 at low levels inside the body. For example, one-millionth of a curie of cobalt-60 inside the lungs or intestines will cause a measurement of two times above the background reading with the standard hand-held survey instrument used for personnel frisking. This amount of internal radioactivity will cause the instrument to reach the alarm level. Every person is required to monitor the entire body upon leaving an area with radioactive surface contamination. Monitoring the entire body is a requirement at the Naval Reactors' Department of Energy facilities; monitoring only a portion of the body, such as just the hands and feet, is not permitted. Therefore, if a person had as little as one-millionth of a curie of cobalt-60 internally, it would readily be detected.

Swallowing one-millionth of a curie of cobalt-60 will cause internal radiation exposure of about 0.08 rem. The radioactivity will pass through the body and be excreted within a period of a little more than one day.

One-millionth of a curie of cobalt-60 still remaining in the lungs one day after an inhalation incident is estimated to cause a radiation exposure of about 2 rem to the lungs over the following year and 6 rem total over a lifetime based on standard calculative techniques recommended by the International Commission on Radiological Protection (ref 12). These techniques provide a convenient way to estimate the radiation exposure a typical individual might be expected to receive from small amounts of internally deposited radioactivity. These techniques account for the gradual removal of cobalt-60 from the lungs through biological processes and the radioactive decay of cobalt-60 with a 5.3 year half-life. However, if an actual case were to occur, the measured biological elimination rate would be used in determining the amount of radiation exposure received.

In addition to the control measures to prevent internal radioactivity and the frisking frequently performed by those who work with radioactive materials, more sensitive internal monitoring is also performed. Equipment designed specifically for monitoring internal radioactivity use a type of gamma radiation sensitive scintillation detector which will reliably detect an amount of cobalt-60 inside the body that is more than one hundred times lower than the one-millionth of a curie used in the examples above. Naval Reactors' prototype sites monitor each employee for internal radioactivity before initially performing radiation work, after terminating radiation work, and periodically in between.

Any person at the prototype who has radioactive contamination above the limit anywhere on the skin of his body during regular monitoring at the exit from a radiologically controlled area is monitored for internal radioactivity with the sensitive internal monitoring equipment. Also any person who might have breathed airborne radioactivity above limits is monitored with the sensitive equipment.

Internal monitoring equipment is calibrated each work shift the equipment is in use. This calibration involves checking the equipment's response to a known source of radiation. In addition, Naval Reactors has an independent quality assurance program in which prototype organizations performing internal monitoring are tested on a periodic basis. This testing involves monitoring a human-equivalent torso phantom, which contains an amount of radioactivity traceable to standards maintained by the National Institute of Standards and Technology. The exact amount of radioactivity in the test phantom is not divulged to the organization being tested until after the test is complete. Any inaccuracies found by these tests that exceed established permissible error limits are investigated and corrected.

Monitoring for Internal Radioactivity at Laboratories

The radionuclides of most concern for internal radiation exposure from laboratory operations include uranium isotopes (uranium-234, uranium-235, and uranium-238) and fission products (primarily strontium-90 and cesium-137). Uranium isotopes are principally alpha emitters. Alpha particles deposit their energy over a much shorter distance than beta or gamma rays because alpha particles are considerably larger in size and have a much greater charge. Fission products emit beta and gamma radiation similar to cobalt-60.

Although uranium-235 is principally an alpha emitter, it also emits several low energy gamma rays. Thorium-234, a daughter of uranium-238, also emits low energy gamma radiation. This low energy gamma radiation can be detected with sensitive scintillation or semi-conductor detectors. For internal monitoring, each laboratory employs a state-of-the-art low energy gamma radiation detection system in a shielded enclosure. These systems are designed to detect levels of uranium in the lungs at levels less than one billionth of a curie. In addition, other systems allow for the detection of higher energy, gamma radiation emitting fission products such as cesium-137 at roughly the same sensitivity as uranium-235. In addition to this type of internal exposure monitoring, personnel who work with certain forms of radioactivity are also required to submit periodic urine samples for extremely sensitive radionuclide analysis. Fecal analysis is also sometimes performed as discussed below. As a measure of the sensitivity of laboratory internal monitoring techniques, the systems used to measure radioactivity in urine and fecal samples are able to measure one ten-trillionth of a curie per liter for urine and one trillionth of a curie per gram for feces. The dose that corresponds to these levels is less than 0.015 rem to the lungs over the following year and 0.075 rem over a lifetime, when monitoring is conducted within 24 hours of a potential internal exposure event.

The laboratories require personnel to be internally monitored before initially assuming duties involving radiation exposure, upon terminating from such duties, and periodically in between. The frequency at which personnel are monitored is determined by their assigned duties. Those personnel who work with radioactive materials more often are monitored more frequently. In addition, like the prototype sites, any person who has radioactive contamination above the limit anywhere on his skin or who might have been exposed to airborne radioactivity above the limit is immediately monitored with the sensitive detector system; these individuals are also required to submit urine and fecal samples as appropriate for the radionuclides involved.

Internal monitoring equipment is calibrated and the calibration is checked each day the equipment is in use. This process involves checking the equipment's response to a known source of radiation. In addition, background checks are performed daily during equipment usage to further verify system performance.

Although internal monitoring is routinely performed at Naval Reactors' Department of Energy facilities, internal monitoring results are not used to control personnel radiation exposure below limits. Rather, work is engineered to prevent radioactivity from becoming internally deposited, and the monitoring is performed to verify that no radioactivity is present.

Results of Internal Monitoring in 1995

During 1995, about 2500 personnel were monitored for internally deposited radioactivity. No personnel had internally deposited radioactivity greater than the minimum detectable activity (MDA) as determined for each analysis as a result of operations at Naval Reactors' Department of Energy facilities.

EFFECTS OF RADIATION ON PERSONNEL

Control of radiation exposure at the Naval Reactors' Department of Energy facilities has always been based on the assumption that any exposure, no matter how small, may involve some risk; however, exposure within the accepted exposure limits represents a risk small compared with normal hazards of life. The basis for this statement is presented below.

Exposure to Radiation May Involve Some Risk

Since the inception of nuclear power, scientists have cautioned that exposure to ionizing radiation in addition to that from natural background may involve some risk. The U. S. National Committee on Radiation Protection and Measurements in 1954 (ref 1) and the International Commission on Radiological Protection in 1958 (ref 2) both recommended that exposures should be kept as low as practicable and that unnecessary exposure should be avoided to minimize this risk. The International Commission on Radiological Protection in 1962 (ref 14) explained the assumed risk as follows:

> "The basis of the Commission's recommendations is that any exposure to radiation may carry some risk. The assumption has been made that, down to the lowest levels of dose, the risk of inducing disease or disability in an individual increases with the dose accumulated by the individual, but is small even at the maximum permissible levels recommended for occupational exposure."

The National Academy of Sciences-National Research Council Advisory Committee on the Biological Effects of Ionizing Radiations included similar statements in its reports in the 1956-1961 period and most recently in 1990 (ref 15). In 1960, the Federal Radiation Council stated (ref 4) that its radiation protection guidance did not differ substantially from recommendations of the National Committee on Radiation Protection and Measurements, the International Commission on Radiological Protection, and the National Academy of Sciences. This statement was again reaffirmed in 1987 (ref 9).

One conclusion from these reports is that radiation exposures to personnel should be minimized. This is not a new conclusion. It has been a major driving force of the Naval Reactors Program since its inception.

Radiation Exposure Comparisons

The success of the Naval Reactors' Department of Energy facilities in minimizing exposures to personnel can be evaluated by making some radiation exposure comparisons.

Annual Exposure

One important measure of personnel exposure is the amount of exposure an individual receives in a year. Tables 2 and 3 show that since 1979, no individual has received more than 2 rem in a year as a result of working at the Naval Reactors' Department of Energy facilities. Also, from Table 4 it can be seen that the average exposure per person monitored has remained essentially constant since 1979 at approximately 0.07 rem for prototype personnel and 0.02 rem for laboratory personnel; the overall average annual exposure is 0.06 rem. The following comparisons give perspective on these individual annual doses in comparison to Federal limits and other exposures:

- The maximum individual annual dose of 2 rem is less than the Federally allowed individual quarterly dose of 3 rem, and is less than one half the Federal annual limit of 5 rem.
- Although no person at the Naval Reactors' Department of Energy facilities has exceeded 2 rem in a year since 1979, annually between 400 and 7000 workers at NRC-licensed commercial nuclear-powered reactors have exceeded 2 rem in various years over this same period (ref 16).
- The average annual exposure of 0.06 rem is:
    - approximately one hundredth of the Federal annual limit of 5 rem.
    - slightly more than one third the average annual exposure of commercial nuclear power plant personnel (ref 16).
    - approximately one third the average annual exposure received by commercial airline flight crew personnel due to cosmic radiation (ref 17).

For additional perspective, the annual exposures for personnel at the Naval Reactors' Department of Energy facilities may also be compared to natural background and medical exposures:

- The maximum annual exposure of 2 rem is less than half the annual exposure from natural radioactivity in the soils in some places in the world, such as Tamil Nadu, India and Meaipe, Brazil (ref 18).
- The average annual exposure of 0.06 rem is:

  - approximately one fifth the average annual exposure to a member of the population in the U. S. from natural background radiation (ref 19).
  - approximately one half the exposure from common diagnostic medical x-ray procedures such as x-rays of the back (ref 20).
  - slightly less than the difference in the annual exposure due to natural background radiation between Denver, Colorado and Washington, D.C. (ref 19).
- The average annual exposure of 0.02 rem for laboratory personnel is approximately equal to the **monthly** exposure to a member of the population in the U. S. from natural background radiation (ref 19).

Collective Dose

The sum of all individual exposures gives the collective dose. Collective dose may be used as a measure of the theoretical effect on the personnel occupationally exposed at the Naval Reactors' Department of Energy facilities taken as a group, and is an indicator of the effectiveness of the Program's efforts to minimize radiation exposure. From Tables 2 and 3, it can be seen that the collective dose received by all 5,465 personnel monitored at the Naval Reactors' Department of Energy facilities in 1995 was 225 man-rem. The following comparisons give perspective on this collective dose in comparison to collective doses from other occupations. This annual collective dose is:

- about one quarter the average annual collective dose to a comparable number of commercial nuclear power plant personnel (ref 16).
- less than two thirds the average annual collective dose to a comparable number of persons in the medical field (ref 17).
- approximately one quarter the average annual collective dose to a comparable number of commercial airline flight crew personnel (ref 17).

For even further perspective, the annual collective dose to personnel at the Naval Reactors' Department of Energy facilities may also be compared to collective doses from radiation exposures not related to an individual's occupation. This annual collective dose is:

- approximately one seventh the average annual collective dose of 1,650 man-rem to a comparable number of individuals in the U. S. population due to natural background radiation (ref 19).

- approximately one third the average annual collective dose of 700 man-rem to a comparable number of individuals in the U. S. population due to diagnostic medical procedures such as x-rays of the back (ref 20).
- approximately one thirtieth the collective dose of 7,100 man-rem to a comparable number of average smokers due to the natural radioactivity in tobacco smoke (ref 10) (rough comparison due to difficulty in estimating effective dose from smoking).

Conclusions on Radiation Exposure to Personnel

From the preceding comparisons, it is concluded that occupational exposures to individuals working at the Naval Reactors' Department of Energy facilities are small when compared to occupational exposures and limits, and are within the range of exposures from natural background radiation in the U. S. and in the world. Additionally, the total dose to all persons (collective dose) each year is small compared to the collective doses to workers in other occupations and in the general U. S. population from natural background radiation, medical procedures, and tobacco smoke. In reference 17 the National Council on Radiation Protection and Measurements reviewed the exposures to the U. S. working population from occupational exposures. This included a review of the occupational exposures to personnel from the Naval Nuclear Propulsion Program. Based on this review, the National Council on Radiation Protection and Measurements concluded:

> "These small values (of occupational exposure) reflect the success of the Navy's efforts to keep doses as low as reasonably achievable (ALARA)."

The same success achieved by the Naval Nuclear Propulsion Program for occupational radiation exposure to Navy personnel has also been achieved for the personnel at the Naval Reactors' Department of Energy facilities.

Studies of the Effects of Radiation on Humans

Observations on the biological effects of ionizing radiation began to be made soon after the discovery of x-rays in 1895 (ref 15).

Numerous references are made in the early literature concerning the potential biological effects of exposure to ionizing radiation. These effects have been intensively investigated for many years (ref 21). Although there still exists some uncertainty about the exact level of risk, the National Academy of Sciences has stated: "It is fair to say that we have more scientific evidence on the hazards of ionizing radiation than on most, if not all, other environmental agents that affect the general public" (ref 22). A large amount of experimental evidence of radiation effects on living systems has come from laboratory studies on cell systems and on animals. However, what sets our extensive knowledge of radiation effects on humans apart from other hazards is the evidence that has been obtained from studies of human populations that have been exposed to radiation in various ways (ref 22). The health effects demonstrated from studies of people exposed to high doses of radiation (that is, significantly higher than current occupational limits) include the induction of cancer, cataracts, sterility, and developmental abnormalities from prenatal exposure. Animal studies have also documented the potential for genetic effects.

Near the end of 1993, the Secretary of Energy requested the disclosure of all records and information on radiation experiments involving human subjects performed or supported by the Department of Energy or predecessor agencies. The Naval Reactors Program has never conducted or supported any radiation experiments on humans. As discussed in this report, the Program has adopted exposure limits recommended by national and international radiation protection standards committees, such as the National Council on Radiation Protection and Measurements and the International Commission on Radiological Protection, and has relied upon conservative designs and disciplined operating and maintenance practices to minimize radiation exposure to levels well below these limits.

High Dose Studies

The human study populations which have contributed a large amount of information about the biological effects of radiation exposure include the survivors of the atomic bombings of Hiroshima and Nagasaki, x-rayed tuberculosis patients, victims of various radiation accidents, patients that have received radiation treatment for a variety of diseases, radium dial painters, and inhabitants of South Pacific islands that received unexpected doses from fallout due to early nuclear weapons tests. All of these populations received high or very high exposures.

The studies of atomic bomb survivors have provided the single most important source of information on the immediate and delayed effects of whole body exposure to ionizing radiation. The studies have been supported for over 40 years by the U. S. and Japanese governments and include analysis of the health of more than 100,000 survivors of the bombings. Continued follow-up of the Japanese survivors has changed the emphasis of concern from genetic effects to the induction of cancer (ref 23).

The induction of cancer has been the major late effect of radiation exposure in the atomic bomb survivors. The tissues most sensitive to the induction of cancer appear to be the bone marrow, thyroid, and female breast. Other cancers linked to radiation, but with a lower sensitivity, include cancers of the lung, stomach, colon, bladder, and esophagus. A wave-like pattern of leukemia induction was seen over time beginning approximately two years after exposure, peaking within 10 years of exposure and diminishing to near baseline levels after 30 years. For other cancers, a statistically significant excess was observed ten or more years after exposure, and the excess risk continues to rise slowly with time (ref 24).

While it is often stated that radiation causes all forms of cancer, many forms of cancer actually show no increase among atomic bomb survivors. These include chronic lymphocytic leukemia, Hodgkin's disease, and cancers of the liver, pancreas, prostate, and testes (ref 23).

To understand the impact of cancer induction from the atomic bombings, it is necessary to compare the number of radiation-related cancers to the total number of cancers expected in the exposed group. In a study sub-group of over 40,000 survivors with doses in the range of 1 rem to 400 rem from the bombings, 3,435 had died from cancer by 1985. Of these, 340 cancer deaths are attributed to radiation exposure (ref 24). At doses below 20 rem, the Japanese data have not revealed a statistically significant excess of cancer (ref 18). The cancer mortality experience of the other human study populations exposed to high doses referenced above is generally consistent with the experience of the Japanese atomic bomb survivors (ref 15).

About 30 years ago the major concern of the effects from radiation exposure centered on possible genetic changes. Ionizing radiation at very high doses was known to cause such effects in many species of plants and animals. However, intense study of nearly 70,000 off-spring of atomic bomb survivors has failed to identify any increase in genetic effects. Based on a recent analysis, humans now appear less sensitive to the genetic effects from radiation exposure than previously thought (ref 23).

Radiation induced cataracts have been observed in atomic bomb survivors and persons treated with very high doses of x-rays to the eye. Approximately 20 years ago, potential cataract induction was considered a matter of concern. However, more recent research indicates the induction of cataracts by radiation is considered to require a high threshold dose. The National Academy of Sciences has stated the threshold for a vision-impairing cataract under conditions of protracted exposure is thought to be no less than 800 rem, which greatly exceeds the amount of radiation that can be accumulated by the lens through occupational exposure to radiation under normal working conditions (ref 15).

Radiation damage to the reproduction cells at very high doses has been observed to result in sterility. Impairment of fertility requires a dose large enough to damage or deplete most of the reproductive cells and is close to a lethal dose if exposure is to the whole body. The National Academy of Sciences estimates the threshold dose necessary to induce sterility is approximately 350 rem, or more, in a single dose (ref 15). As in the case of cataract induction, this dose far exceeds the dose that can be received from occupational exposure under normal working conditions.

Developmental abnormalities were observed among children of the atomic bomb survivors that received high prenatal exposure (that is, their mothers were pregnant at the time of the exposure). These abnormalities included stunted growth, small head size, and mental retardation. Additionally, recent analysis suggests that during a certain stage of development (the 8th to 15th week of pregnancy) the developing brain appears to be especially sensitive to radiation. A slight lowering of IQ might follow doses of 10 rem or more (ref 15).

From this discussion of the health effects observed in studies of human populations exposed to high doses of radiation, it can be seen that the most important of the effects from the standpoint of occupationally exposed workers is the potential for induction of cancer (ref 15).

Low Dose Studies

The cancer causing effects of radiation on the bone marrow, female breast, thyroid, lung, stomach and other organs reported for the atomic bomb survivors are similar to findings reported for other irradiated human populations. With few exceptions, however, the effects have been observed only at high doses and high dose rates. Studies of populations chronically exposed to low-level radiation have not shown consistent or conclusive evidence of an associated increase in the risk of cancer (ref 15). Attempts to observe increased cancer in a human population exposed to low doses of radiation have been difficult.

One problem in such studies is the number of people needed to provide sufficient statistics. As the dose to the exposed group decreases, the number of people needed to detect an increase in cancer goes up at an accelerated rate. For example, for a group exposed to 1 rem (equivalent to the average lifetime accumulated dose for an individual working at a Naval Reactors' Department of Energy facility) it would take more than 500,000 people in order to detect an excess in lung cancers based on current estimates of the risk (ref 25). This is more than three times the number of persons that have performed radioactive work at all of the Naval Reactors' Department of Energy facilities over the last four decades. Another limiting factor is the relatively short time since low dose occupational exposure started being received by large groups of people. As discussed previously, data from the atomic bomb survivors indicates a long latency period between the time of exposure and expression of the disease.

There is also the compounding factor that cancer is a generalization for a group of approximately 300 separate diseases, many being relatively rare and having different apparent causes. It is difficult to analyze low dose study data to eliminate the possibility that some factor other than radiation may be causing an apparent increase in cancer induction. This difficulty is particularly apparent in studies of lung cancer, for example, where smoking is such a common exposure, is poorly documented as to individual habits, and is by far the primary cause of lung cancer. Because cancer induction is statistical in nature, low dose studies are limited by the fact that an apparent observed small increase in a cancer may be due to chance alone.

Despite the above mentioned problems, and the lack of consistent or conclusive evidence from such studies to date, low dose studies fulfill an important function. They are the only means available for eventually testing the validity of current risk estimates derived from data accumulated at higher doses and higher dose rates.

Low dose groups that have been, and are currently being, studied include groups exposed as a result of medical procedures; exposed to fallout from nuclear weapons testing; living near nuclear installations; living in areas of high natural background radiation; and occupationally exposed to low doses of radiation. The National Academy of Sciences has reviewed a number of the low dose studies in references 15 and 22. Their overall conclusion from reviewing these studies was:

> "Studies of populations chronically exposed to low-level radiation, such as those residing in regions of elevated natural background radiation, have not shown consistent or conclusive evidence of an associated increase in the risk of cancer." (ref 15)

This conclusion has been supported by studies that have been completed since reference 15 was published. For example in 1990, the National Cancer Institute completed a study of cancer in populations living near 62 nuclear facilities in the U.S. that had been in operation prior to 1982. This study included commercial nuclear power plants and Department of Energy facilities involved in activities employing radioactive materials. The conclusion of the National Cancer Institute study was:

> "There was no evidence to suggest that the occurrence of leukemia or any other form of cancer was generally higher in the (counties near the nuclear facilities) than in the (counties remote from nuclear facilities)." (ref 26)

At the request of the Three Mile Island Public Health Fund, an investigation was performed by independent researchers of whether or not the pattern of cancer in the 10-mile area surrounding the Three Mile Island (TMI) nuclear plant had changed after the TMI-2 accident in March 1979 and, if so, whether the change was related to radiation releases from the plant. A conclusion of this study was:

> "For accident emissions, the authors failed to find definite effects of exposure on the cancer types and population subgroups thought to be most susceptible to radiation. No associations were seen for leukemia in adults or for childhood cancers as a group." (ref 27)

Of particular interest to workers at the Naval Reactors' Department of Energy facilities are studies of groups occupationally exposed to radiation. A recent survey of radiation worker populations in the U. S. shows there are about 350,000 workers currently under study (ref 25). For more than a decade, Naval Reactors Program personnel have been included among populations being studied. These studies are discussed below.

In 1978, Congress directed the National Institute for Occupational Safety and Health (NIOSH) to perform a study of workers at the Portsmouth Naval Shipyard (PNS). Congress also chartered an independent oversight committee of nine national experts to oversee the performance of the study in order to assure technical adequacy and independence of the results. NIOSH concluded that "excesses of deaths due to malignant neoplasms and specifically due to neoplasms of the blood and blood-forming tissue, were not evident in civilian workers at PNS" (ref 28). NIOSH did two follow-up studies focusing on leukemia and lung cancer and also concluded that radiation exposure at the Shipyard could not be shown to have contributed to the number of deaths from these causes (refs 29 and 30).

In 1991, researchers from the Johns Hopkins University, Baltimore, Maryland, completed a more comprehensive epidemiological study of the health of workers at the six Navy shipyards (including Portsmouth Naval Shipyard, discussed above) and two private shipyards that service the Navy's nuclear-powered ships (ref 31). This independent study evaluated a population of 70,730 civilian workers over a period from 1957, beginning with the first overhaul of the first nuclear-powered submarine, USS

NAUTILUS, through 1981, to determine whether there was an excess risk of leukemia or other cancers associated with exposure to low levels of gamma radiation. This study is of particular interest to workers at the Naval Reactors' Department of Energy facilities because the type of radioactivity, level of exposure, and method of radiological controls at these shipyards are similar to the Naval Reactors' Department of Energy facilities.

This study did not show any cancer risks linked to radiation exposure. Furthermore, the overall death rate among radiation-exposed shipyard workers was less than the death rate for the general U. S. population. It is well recognized that many worker populations have lower mortality rates than the general population, because the workers must be healthy to perform their work. This study shows that the radiation-exposed shipyard population falls in this category.

The death rate for cancer and leukemia among the radiation-exposed workers was slightly lower than that for non-radiation-exposed workers and that for the general U. S. population. However, an increased rate of mesothelioma, a type of respiratory system cancer linked to asbestos exposure, was found in both radiation-exposed and non-radiation-exposed shipyard workers, although the number of cases was small reflecting the rarity of this disease in the general population. The researchers suspect that shipyard worker exposure to asbestos in the early years of the Program, when the hazards associated with asbestos were not as well understood as they are today, might account for this increase.

In conclusion, the Johns Hopkins study found no evidence to conclude that the health of people involved in work on U. S. nuclear-powered ships has been adversely affected by exposure to low levels of radiation incidental to this work. The average annual radiation exposure for these shipyard workers is about two times higher than the exposure received by personnel assigned to Naval Reactors nuclear propulsion prototype sites and eight times higher than the exposure received by personnel at the Naval Reactors laboratories. Additional studies are planned to investigate the observations and update the shipyard study with data beyond 1981.

In 1978, the Department of Energy contracted with the Oak Ridge Associated Universities to perform a study of workers who were occupationally exposed to greater than five rem in a single year between 1947 and 1978. A group of about 3200 individuals was identified, including workers at 31 Department of Energy facilities (including six Naval Reactors' Department of Energy facilities) and seven Naval Reactors Program shipyards. Although a final report of this study has not yet been published, preliminary findings show mortality rates lower than those for the general population. This lower rate is probably a result of the "healthy worker effect" (described above with respect to the study performed by The Johns Hopkins University) and the low average age of the study group (58 years old at the time of reporting). Later phases of the study will compare the greater than five rem group to a similar worker group to assess whether the additional radiation exposure has had any impact on the mortality rate (ref 32).

In 1994, NIOSH began conducting an epidemiological study of the health of workers at the Idaho National Engineering Laboratory (INEL) who are occupationally exposed to radiation. This study includes civilian workers at the Naval Reactors Facility (NRF), which is located within INEL. This study is ongoing.

Numerical Estimates of Risk from Radiation

One of the major aims of the studies of exposed populations as discussed above is to develop numerical estimates of the risk of radiation exposure. These risk estimates are useful in addressing the question of how hazardous radiation exposure is, evaluating and setting radiation protection standards, and helping resolve claims for compensation by exposed individuals.

The development of numerical risk estimates has many uncertainties. As discussed above, excess cancers attributed to radiation exposure can only be observed in populations exposed to high doses and high dose rates. However, the risk estimates are needed for use in evaluating exposures from low doses and low dose rates. Therefore, the risk estimates derived from the high dose studies must be extrapolated to low doses. This extrapolation introduces a major uncertainty. The shape of the curve used to perform this extrapolation becomes a matter of hypothesis (that is, assumption) rather than observation. The inability to observe the shape of this extrapolated curve is a major source of controversy over the appropriate risk estimate.

Scientific committees, such as the National Academy of Sciences-National Research Council Advisory Committee on the Biological Effects of Ionizing Radiations (ref 15), the United Nations Scientific Committee on the Effects of Atomic Radiation (ref 18), and the National Council on Radiation Protection and Measurements (ref 11) all conclude that accumulation of dose over weeks, or months, as opposed to in a single dose, is expected to reduce the risk appreciably. A dose rate effectiveness factor (DREF) is applied as a divisor to the risk estimates at high doses to permit extrapolation to low doses. The National Academy of Sciences (ref 15) suggested that a range of DREF's between 2 and 10 may be applicable and reported a best estimate of 4 based on laboratory animal studies. However, despite these conclusions by the scientific committees, some critics argue that the risk actually increases at low doses while others argue that cancer induction is a threshold effect and the risk is zero below the threshold dose. As stated at the beginning of this section, the Naval Reactors Program has always conservatively assumed radiation exposure, no matter how small, may involve some risk.

In 1972, both the United Nations Scientific Committee on the Effects of Atomic Radiation and the National Academy of Sciences-National Research Council Advisory Committee on the Biological Effects of Ionizing Radiations issued reports (refs 33 and 34) which estimated numerical risks for specific types of cancer from radiation exposures to humans. Since then, national and international scientific committees have been periodically reevaluating and revising these numerical estimates based on the latest data and information. The most recent risk estimates are from the same two committees and are contained in their 1988 and 1990 reports, respectively (refs 18 and 15). In these reports, both committees provided risk estimates which were larger than the risk estimates in their previous reports. This increase in the new estimates was due to the use of new models for projecting the risk into the future, revised dose estimates for survivors of the Hiroshima and Nagasaki atomic bombs, and additional data on the cancer experience by both atomic bomb survivors and persons exposed to radiation for medical purposes. A risk estimate for radiation-induced cancer derived from the most recent analyses, references 15 and 18, can be briefly summarized as follows:

> In a group of 10,000 workers in the U. S., a total of about 2,000 (20 percent) will normally die of cancer. If each of the 10,000 received over his or her career an additional one rem, then an estimated 4 additional cancer deaths (0.04 percent) might occur. Therefore, the average worker's lifetime risk of cancer has been increased nominally from 20 percent to 20.04 percent.

The above risk estimate was extrapolated from estimates applicable to high doses and dose rates using a DREF of about 2. This estimate probably overstates the true lifetime risk at low doses and dose rates, because a DREF of 2 is at the low end of probable DREF values. The National Academy of Sciences (ref 15), in assessing the various sources of uncertainty, concluded that the true lifetime risk may be contained within an interval which extends from zero to about a factor of three higher than the above. The Academy points out that the lower limit of uncertainty extends to zero risk, "as the possibility that there may be no risks from exposures comparable to external natural background radiation cannot be ruled out."

These statistics can be used to develop a risk estimate for personnel exposed to radiation associated with Naval Reactors' Department of Energy facilities. As stated previously, the average lifetime accumulated exposure for these personnel is about one rem. Therefore, based on the risk estimate presented above, the average worker's lifetime cancer risk at the Naval

Reactors' Department of Energy facilities may be statistically increased by about four one-hundredths of one percent, or from 20 percent for the general population to 20.04 percent for a worker at the Naval Reactors' Department of Energy facilities.

Risk Comparisons

Table 6 compares calculated risks from occupational exposure at the Naval Reactors' Department of Energy facilities to other occupational risks. This permits evaluation of the relative hazard of this risk versus risks normally accepted in the workplace. It should be kept in mind that the radiation risk is calculated based on risk estimates, whereas the other occupational risks are based on actual death statistics for the occupation.

TABLE 6

LIFETIME OCCUPATIONAL RISKS

Occupation (ref 11)	Lifetime Risk[1] Percent
Mining, quarrying	2.8
Agriculture	2.2
Construction	1.8
Transportation and Public Utilities	1.3
All Industries Average	0.5
Government	0.4
Services	0.3
Manufacturing	0.3
Trade	0.2
Radiation exposure associated with Naval Reactors' Department of Energy facilities (risk estimate)	0.04

Further perspective on the lifetime risk from radiation exposure at the Naval Reactors' Department of Energy facilities may be gained by comparison to other everyday risks as shown in Table 7.

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[1] Assumes working from age 18 to 65 (47 years).

TABLE 7

SOME COMMONPLACE LIFETIME RISKS

Risk (ref 35)	Lifetime Risk[1] Percent
Smoking	12
Motor Vehicle Accidents	1.3
Home Accidents	0.79
Falls	0.45
Drowning	0.26
Fires	0.20
Accidental Poisoning	0.10
Firearms	0.07
Electrocution	0.04
Radiation exposure associated with Naval Reactors' Department of Energy facilities (risk estimate)	0.04

Low-Level Radiation Controversy

In low-level radiation, as in other areas, a very effective way to frighten people is to claim that no one knows what the effects are. This has been repeated so often that it has almost become an article of faith that no one knows the effects of low-level radiation on humans. The critics are able to make this statement because, as discussed above, human studies of low-level radiation exposure are unable to be conclusive as to whether or not an effect exists in the exposed groups, because of the extremely low incidence of an effect. Therefore, assumptions are needed regarding extrapolation from high dose groups. The reason low dose studies are not able to be conclusive is because the risk, if it exists at these low levels, is too small to be seen in the presence of all the other risks of life.

The fact that a controversy exists is evidence that the radiation risk is small.

In summary, the effect of radiation exposures at occupational levels is extremely small. There are physical limits to how far scientists can go to ascertain precisely the size of this risk, but it is known to be small. Instead of proclaiming how little is known about low-level radiation, it is more appropriate to emphasize how much is known about the small actual effects.

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[1] Smoking assumes at risk from age 32 to 72 (40 years) and Motor Vehicle Accidents assume at risk from age 18 to 72 (54 years). Other risks assume at risk for lifetime (72 years).

Conclusions on the Effects of Radiation on Personnel

This perspective provides a better position to answer the question, "Is radiation safe?". If safe means zero effect, then the conclusion would have to be that radiation may be unsafe. But to be consistent, background radiation and medical radiation would also have to be considered unsafe. Or more simply, being alive is unsafe.

"Safe" is a relative term. Comparisons are necessary for actual meaning. For a worker, safe means the risk is small compared to other risks accepted in normal work activities. Aside from work, safe means the risk is small compared to the risks routinely accepted in life.

Each recommendation on limits for radiation exposure from the scientific and advisory organizations referenced herein has emphasized the need to minimize radiation exposure. Thus, the Naval Reactors Program is committed to keeping radiation exposure to personnel as low as reasonably achievable. No level of radiation exposure has been identified for which responsible organizations have agreed there is no effect. Similarly, it is difficult to find a single activity of man for which one can confidently state the risk is zero. However, the above summaries show that the risk from radiation exposure associated with the Naval Reactors' Department of Energy facilities is low compared to the risks normally accepted in industrial work and in daily life outside of work.

CLAIMS FOR RADIATION INJURY TO PERSONNEL

Personnel who consider they have received an occupational injury may file claims. The personnel who operate the Naval Reactors' Department of Energy facilities are employees of corporations operating facilities under contract to the Department of Energy. These personnel file claims under state workmen's compensation laws. The claim may be handled through the contractor's insurance carrier or adjudicated by an administrative law judge. Either the employee or the contractor may appeal the judge's decision.

A case does not require a decision subsequent to filing unless it is actively pursued. A claim may lie dormant for many years theoretically to be pursued at a later date, whereupon a decision will be made. For the purpose of this report, claims which have had no activity in the last five years are counted as deferred.

There have been a total of five claims filed for injury from radiation associated with Naval Reactors' Department of Energy facilities. Of these claims, one was awarded and four have either been denied or deferred. The one case that was awarded occurred in 1955 and involved loss of hearing. A fine particle of radioactive material had entered the individual's ear canal and became lodged. The particle remained in the ear canal for approximately nine days; as a result, the individual received a very high localized exposure to the ear drum. Following this incident, the individual suffered a 65 percent hearing loss in the affected ear. The claim was awarded in 1959.

AUDITS AND REVIEWS

Checks and cross-checks, audits, and inspections of numerous kinds have been shown to be essential in maintaining high standards of radiological controls. First, each worker is specially trained in radiological controls as it relates to his own job. Second, written procedures exist which require verbatim compliance. Third, radiological controls technicians and their supervisors oversee radioactive work. Fourth, personnel independent of radiological controls technicians are responsible for processing personnel dosimeters and maintaining radiation exposure records.

Fifth, a strong independent audit program is required covering all radiological controls requirements. In all facilities this radiological audit group is independent of the radiological controls organization and its findings are reported regularly to senior management. This group performs continuing surveillance of radioactive work. It conducts in-depth audits of specific areas of radiological controls. This group checks all radiological controls requirements at least annually.

Sixth, the U. S. Department of Energy assigns to each facility a representative who reports to the Director of the Naval Nuclear Propulsion Program at headquarters. One assistant to this representative is assigned full time to audit and review radiological controls. Seventh, Office of Naval Reactors headquarters personnel conduct periodic inspections of radiological controls in each facility.

In addition, various aspects of the Naval Reactors Program have been reviewed by other Government agencies. For example, the General Accounting Office (GAO) performed a fourteen month in-depth review of various aspects of the Naval Reactors' Department of Energy facilities. The GAO published the results of its evaluation in August 1991 (ref 36) which stated the following conclusions:

- "We believe Naval Reactors Laboratories are accurately measuring, recording, and reporting radiation exposures."
- "Naval Reactors reported exposures show that exposures have been minimal and overall are lower than commercial nuclear facilities and other DOE facilities."

ABNORMAL OCCURRENCES

It is a fact of human nature that people make mistakes. The key to a good radiological controls program is to find the mistakes while they are small and prevent the combinations of mistakes that lead to more serious consequences. The preceding section on inspections supports the conclusion that the Naval Reactors Program gives more attention to errors and their prevention than to any other single subject. Requiring constant focus on improving performance of radiological work has proven effective in reducing errors.

In addition, radiological controls technicians are authorized and required to stop anyone performing work in a manner which could lead to radiological deficiencies. One definition of "deficiency" is a failure to follow a written procedure verbatim. However, the broadest interpretation of the term "deficiency" is used in the Naval Reactors' Department of Energy facilities' radiological controls program. Anything involved with radiation or radioactivity which could have been done better is also considered a radiological deficiency.

Radiological deficiencies receive management attention. There is a higher level of deficiency that is defined as a radiological incident. Incidents receive further management review, including evaluation by senior personnel at the Office of Naval Reactors headquarters and review by the Director of the Naval Nuclear Propulsion Program. Improvement programs over the years have consistently aimed at reducing the numbers of radiological incidents. As improvements occurred, the definition of what constitutes a Naval Reactors incident was changed to define smaller deficiencies as incidents. These changes were made so that the incident reporting system would continue to play a key role in upgrading radiological controls. As a result, it is not practicable to measure performance over time merely by counting numbers of radiological incidents or deficiencies.

The Department of Energy and its predecessors have used a separate reporting system that has been nearly constant over time and therefore can be used as a basis for comparison. This system defines a Type A radiation exposure occurrence as an event which causes an individual's external radiation exposure to exceed 25 rem in one incident or one year (ref 37). The Nuclear Regulatory Commission uses a similar criteria to define a radiation related abnormal occurrence; abnormal occurrences are included in the NRC's quarterly report to Congress. The Office of Naval Reactors regularly evaluates radiological events using these criteria for comparison.

Since the beginning of operations at the Naval Reactors' Department of Energy facilities, there has not been a single radiation incident which met the criteria of a Type A or abnormal occurrence.

The policy of the Naval Reactors Program is to provide for close cooperation and effective communication with state radiological officials involving occurrences that might cause concern because of radiological effects associated with Program facilities. The Naval Reactors Program has reviewed radiological matters with state radiological officials in the states where Naval Reactors' Department of Energy facilities operate. Although there has never been an abnormal occurrence which has resulted in radiological effects to the public outside these facilities or which resulted in radiological injury to residents of the states working inside these facilities, states were notified when inquiries showed public interest in the possibility such events had occurred.

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THURSDAY, MARCH 28, 1996.

DEFENSE PROGRAMS

WITNESSES

DR. VICTOR H. REIS, ASSISTANT SECRETARY FOR DEFENSE PROGRAMS

DR. JERRY FREEDMAN, DEPUTY ASSISTANT TO THE SECRETARY OF DEFENSE, NUCLEAR MATTERS

JOAN B. ROHLFING, DIRECTOR, OFFICE OF NONPROLIFERATION AND NATIONAL SECURITY

Mr. MYERS. The committee will come to order. Would you please close the door?

Pursuant to the decision reached last Thursday by this committee, this session will continue to be in Executive Session. Only those with appropriate, proper clearances may remain in the room.

The staff from the Appropriations Committee has all been properly cleared.

Can you verify that everybody in the room has proper clearance?

Ms. ABDINOOR. Yes.

Mr. MYERS. Let the record show that everyone is cleared.

I would remind the Members that nothing goes out of the room from what is being heard here today. It is difficult to tell what is classified and what is not, but we have to consider it all to be classified. So let's proceed.

Dr. Reis, thank you very much for appearing and your associates, Dr. Freedman and Ms. Rohlfing, and your backup crew, your associates. Your prepared statements will be placed in the record, and you may proceed as you like.

DEFENSE PROGRAMS FY 1997 BUDGET REQUEST

Dr. REIS. Thank you, Mr. Chairman. It is a pleasure to present to you the Department of Energy's Defense Programs budget for fiscal year 1997.

This budget request is for $3.71 billion. This represents an increase of approximately $250 million over what we were allocated in fiscal 1996, but more importantly, represents the completion of the transition phase for nuclear weapons—for the nuclear weapons enterprise following the end of the Cold War and the beginning of a new era.

This new era was codified by the Department of Defense's Nuclear Posture Review, signed by the President on September 11, 1994.

The President's statement of August 11, 1995, where he committed the U.S. to seek a zero yield Comprehensive Test Ban Treaty, the Senate's ratification of the START II Treaty on January 26 of this year, the President's signing of the Nuclear Weapons Stockpile

Memorandum on March 11 of this year, and of course, Public Laws 104–46 and 104–106, passed by the Congress for fiscal year 1996.

In its essence, this new era is characterized by three basic elements:

One, the mission of the nuclear forces remains that deterrence; there are too many nuclear weapons worldwide for the U.S. to abandon this keystone of national security.

Two, the production of new nuclear weapons will be replaced by stockpile life extension. The current stockpile will be extended indefinitely.

Three, underground nuclear testing will be replaced by stockpile stewardship reassessment, and certification will be decommissioned by detailed nonnuclear testing experimentation and simulation.

The concept of stockpile life extension is anchored in the fact that the current stockpile is modern, well-tested, reliable and safe. We recognize that each and every component in each and every weapon has only a limited life and must be replaced at some time. This involves both a vigorous surveillance program to search for defects, enhanced surveillance to predict when aging defects might occur, and the ability to replace and certify new parts. This, in turn, requires a flexibility in manufacturing capability that can produce parts to appropriate specification at the appropriate rate.

TRITIUM CAPABILITY

The Secretary of Energy announced as part of the programmatic EIS that downsizing and modernizing Oak Ridge Y–12, Kansas City, and Pantex, plus upgrading the Los Alamos tritium capability, is the Department's preferred alternative to meeting this new production requirement.

Perhaps the most obvious limit in life is the radioactive isotope tritium. Tritium is an essential ingredient in all U.S. nuclear weapons and decays at 5 percent a year. The U.S. has not produced tritium since 1988, using tritium from dismantled weapons to make up for the tritium that naturally decays. But a new source will be needed, and last December 5th, the Secretary announced that the Department's preferred alternative is to go with a dual-track approach of a commercial light water reactor with an accelerator, with a final decision to come in fiscal 1998.

STOCKPILE STEWARDSHIP

Like stockpile life extension, the concept of a stewardship is likewise anchored in satisfactory performance and an underground nuclear test database of the current stockpile. But it critically depends on the skills, knowledge and judgment of the people at the weapons labs.

In practice, it involves a detailed breakdown of all the processes in a nuclear explosion and potential nuclear accidents, and an application of all the best experimental and computational tools to be able to asses and certify the nuclear weapons as they age and components are replaced.

Stewardship is not an abstract concept. In the past few years, there have been several examples where problems have been identified that in the past we would have called for nuclear underground tests to resolve.

In one such example, an aging defect was discovered—that was on the W76, the Trident nuclear warhead; and initial assessments varied widely on its effect and weapons performance. To get an answer, independent assessments at each weapons design lab were obtained, using new computational codes validated by lasers, the Nova, Pegasus machines, stock tube devices, and archival underground test data. The result was that the defect was judged to be small, and the Department of Defense, who was a partner in all of this, concurred with the result.

I would be glad to go into that in more detail if we have time during the course of the testimony.

But we know in the future, as the stockpile ages and as components are replaced and as we get further and further away from the nuclear test database, the current tools for assessment and certification must improve dramatically if we are to maintain the stockpile without testing. That is the basis for the new experimental facilities: the National Ignition Facility, the Dual Access Radiographic Hydrodynamic Test Facility, Atlas Pulse Power Device, and computational capability through the Accelerated Strategic Computing Initiative.

These new programs are designed to respond to the new requirements, plus our ongoing programs of weapons dismantlement and the emergency response are described in my written testimony.

I must stress to you, Mr. Chairman, that this is not a risk-free program. The President recognized this when he stated in his announcement on the zero yield Comprehensive Test Ban Treaty, and I quote, "I order for this program to succeed, both the Administration and the Congress must provide sustained bipartisan support for the stockpile stewardship program over the next decade and beyond."

He initiated a process whereby each laboratory director and commander of the Strategic Command must certify each year on the health of the stockpile and he directed we maintain the readiness of the Nevada Test Site. The Senate last January 26, in ratifying START II by a vote of 84—by a vote of 87 to 4, added similar conditions.

Mr. Chairman, I believe we can satisfy the requirements laid upon us by the President, the Department of Defense and the Congress. I believe we can maintain the current stockpile without nuclear testing for the foreseeable future, because I believe in the skills, the courage and the judgment in the men and women in the laboratories and weapons nuclear complex. I urge you to give them the tolls to do the job, and I look forward, as always, to working with you and your staff and answering any questions you might have. Thank you.

[The prepared statement of Dr. Reis appears at the end of the hearing record.]

Mr. MYERS. Thank you, Dr. Reis. I am certain we will have questions at the end.

Dr. Freedman, your prepared statement will be placed in the record, and you may proceed.

DOD OVERVIEW

Dr. FREEDMAN. Thank you. I would like to echo a good bit of what Dr. Reis has said but from the perspective of the Department of Defense.

Today our Nation's stockpile of nuclear weapons is safe and reliable. The challenge for both Departments, of course, is to maintain high confidence in those weapons in the absence of underground nuclear testing. This challenge will, of course, become more difficult because our stockpile will soon be the oldest in our Nation's history. Older weapons will have problems; we have seen that historically.

The DOE, the Department of Energy, must have the capability to anticipate those problems and solve those problems in a timely manner, so that we would not have difficulty or have to remove an entire type of warhead class or return to underground testing.

That is the principal goal that we look to the DOE to maintain.

Dr. Reis mentioned the nuclear posture review, and in the nuclear posture review, the Department of Defense listed specific requirements for the Department of Energy. Number one, we said, develop a stockpile surveillance engineering base; we have been surveilling weapons in the past, but we want an enhanced surveillance program. And the DOE is taking that guidance.

We want to be able to have the capability demonstrated that we can refabricate and certify those weapons that have been refabricated.

We know, in time, we will have to replace warheads whether it is due to aging or due to our program of quality assurance and reliability testing.

We have also asked that they maintain a science and technology base to support this activity, and most importantly, at the end that, we have a clear understanding of tritium availability.

In response to that guidance, as Dr. Reis mentioned, and it was given September 1994 as the nuclear posture review, the DOE has been working to put together a stockpile stewardship program with assistance and input from the Department of Defense; and I should point out that the requirements that we asked the DOE to meet are independent of whether we are in the lead or the hedge phase, as demonstrated and delineated in the nuclear posture review.

So that is a point I wish to really make clear.

As far as tritium is concerned, the DOE's decision to go with the dual track, the accelerator and reactor approach, was reviewed and approved by the Nuclear Weapons Council. We monitor that, and we are satisfied that we are on a path that will deliver tritium in a timely manner.

We will welcome the decision in 1998 by the secretary of Energy to proceed forward.

Dr. Reis also mentioned the President's August 11, 1995 speech, which was indeed a landmark for us because it said—the speech said that for us to enter into the Comprehensive Test Ban Treaty there were certain conditions, and Dr. Reis mentioned a number of those.

One thing that was identified was a new reporting process, and annual reporting process, whereby a vast number of people associated with the weapons program, the strategic command, the lab directors, and ultimately reporting to both Secretaries of Energy and Defense will in fact certify that these weapons are safe and reliable; and the President indicated that in the event that that is not true, he would take certain actions—was prepared to take certain actions after consultation with the Congress.

So that really is the safeguard that we have, but our goal, of course, is not to invoke that. Our goal is, through a good stockpile stewardship program, to maintain the stockpile so that it remains safe and reliable.

Today, I can say that the program is receiving the necessary resources and, further, the long-range plan that is mapped out by the DOE is proceeding in the right direction to meet this challenge.

This is a challenge that exceeds those that we have had in the past, because of the lack of underground testing, which has been the basis for our development, and our maintenance of the stockpile.

We will continue at the DOD to work with the Department of Energy to establish performance measures for their Stockpile Stewardship and Management Program so that we are satisfied that we are on a track and that we will keep our weapons safe and reliable. We will use our Nuclear Weapons Council, which is the joint forum that we have to resolve issues and ultimately issue guidance that applies to both departments.

That concludes my remarks. I will be pleased to accept your questions now or for the record.

Mr. MYERS. Thank you, Dr. Freedman.

[The prepared statement of Dr. Freedman appears at the end of the hearing record.]

NONPROLIFERATION OPENING REMARKS

Mr. MYERS. Director Rohlfing, welcome back to the House.

Ms. ROHLFING. Thank you—I think.

Mr. MYERS. You are not out of here yet, that is right.

Ms. ROHLFING. That is right. This is not my first hearing before the House, although it is my first hearing before this committee. I would like to thank you for inviting me to attend today and offer an overview of DOE's Nonproliferation and National Security activities.

Mr. MYERS. Fortunately for you, you don't have to appear before a couple of us anymore, but we would be pleased to hear from you. Your prepared statement will be placed in the record.

NONPROLIFERATION ACCOMPLISHMENTS

Ms. ROHLFING. Thank you very, very much. Because time is short and I know you have a full agenda, I will confine my remarks to a brief description of only two of the Department's remarkable accomplishments in the area of nonproliferation over the last year.

Let me start by describing the great progress we have made in helping Russia and other former Soviet states secure their nuclear materials.

MATERIALS PROTECTION CONTROL AND ACCOUNTING

Last year my predecessor, Mr. Ken Baker, come before this committee and recounted our success in initiating a program we call Materials Protection, Control and Accounting. At this time last year, we had completed security upgrades at only one nuclear facility in Russia, a civilian facility at the Kurchatov Institute. We were very proud of that work, and as some of you may remember, we brought poster-sized "before-and-after" pictures to show the committee.

I am pleased to report to you, that today, only one year later, we have achieved agreements with over 35 locations in the former Soviet Union, and we continue to conclude agreements with additional sites at a rapid pace.

I didn't bring "before-and-after" pictures this year, but I did bring a map I would like to share with you that shows you—it is a bit of an eye chart; we could bring it closer. The purpose is not to read every word on the page, but to note the many different dots on that map.

Last year, we would have had only one push pin in the map, if you will, to reflect the work that we did at the Kurchatov Institute. This year, you can see we have agreements in place with a much larger number of facilities across the complex, both in Russia as well as the other former Soviet states.

Last year when we testified before the committee, we had secured approximately 75 kilograms of highly enriched uranium. Since our last testimony, we have secured tons of nuclear material and will improve the security of tens of additional tons by the end of 1996. These are remarkable achievements by any measure, but even more so in light of the fact that our work at each facility must be done on a negotiated, cooperative basis.

Last year, based on promise of progress and demonstrated success at a single facility, the committee supported our budget request of $70 million for this fiscal year. We believe we have delivered on and even exceeded out commitments to you last year. Based on this demonstrated record of achievement and the anticipation of continued rapid progress, we request the committee's support of $94.2 million for this program in fiscal year 1997.

CALIOPE

The second and final nonproliferation highlight I want to note for you this afternoon concerns a technological breakthrough the Department achieved last summer. In the Department's Nonproliferation Research and Development program, we are working to develop technologies that will allow us to detect covert production of plutonium and highly enriched uranium by proliferant nations.

A proliferant's most difficult step in developing nuclear weapons is the acquisition of weapons grade plutonium and uranium. Our ability to detect covert, indigenous production of these materials is therefore critical to our ability to identify proliferation threats as they are emerging, and essential to developing appropriate responses.

Today, our ability to detect covert materials production is limited by our ability to gain access or proximity to suspect facilities. One of the primary goals of our nonproliferation R&D program, therefore, is to detect the production of these materials remotely, thus eliminating our dependency on access or proximity to a suspect facility.

At DOE we are currently pursuing this goal of remote detection in a technology development program called CALIOPE. [Deleted] detect the presence of chemicals that are indicative of nuclear materials production. Last summer, using prototype equipment set up in a field environment, we demonstrated the ability to detect some chemicals of interest at a significant standoff distance.

Based on this breakthrough, we are optimistic that within the next four years, we will complete technology development and field a new national capability for proliferation detection.

CALIOPE is only one example of the important work accomplished through this R&D program. The Department's Nonproliferation R&D program is a unique program dedicated to providing the technologies and systems needed to monitor, detect and characterize proliferant activities worldwide, both cooperatively and non-cooperatively. Your support for the Department's fiscal year 1997 budget request of $195 million for Nonproliferation R&D is vital to ensuring the Nation's continued capability to detect and deter proliferation, to verify treaties and to respond to future challenges.

Thank you very much.

[The prepared statement of Ms. Rohlfing appears at the end of the hearing record.]

Mr. MYERS. Well, thanks to each of you for your very fine statements. It is kind of a big load really to cover all these subjects in an hour or hour-and-a-half, or maybe even two hours.

Stockpile stewardship has changed through the years that Mr. Bevill and I have been on this committee from nothing at all to a plan. Do you still have a five-year plan?

Dr. REIS. Yes, we do.

Mr. MYERS. After five years, this gets revisited at least once a year?

DOD AND DOE PLANNING

Dr. REIS. As a result of both the Congress and our friends in the Department of Defense, we have now put together a detailed plan which really stretches out for ten years. We are sending that up to the Hill, and we are in the process of getting clearance from OMB now. It is classified, it is considerably detailed, and we have worked that out. It is a joint DOE/Department of Defense program, and it will change with time. We have not put it in looseleaf binders, but that will be continually updated.

Mr. MYERS. Department of Defense/DOE, I am not sure that is the proper way to set it up. Who reports to whom and who is completely responsible? I know DOE is technically responsible, but then everything is cleared through Department of Defense and you don't do it unless they do. Isn't that kind of cumbersome? Is there a better way to handle that?

If you were starting it all over and had the responsibility for designing it, would that be the way we should do it?

Dr. REIS. This really does date back to the Manhattan Project.

Mr. MYERS. Sure.

Dr. REIS. And the nuclear weapons at the time were so unique and so different from any other kind that the President—President Truman and every other President who has looked at this went back and said, no, this is something that ought to remain in a separate agency with civilian control.

As time has gone one, I think you could question that, and of course, we have questioned that. We continue to question that. It really is more than bureaucratics to deal with it.

I looked at that from the other perspective when I was Director of Defense Research and Engineering, because that was one of the first things that came on my plate over there, shouldn't we really come together and start to think about that now. My decision then, working with the Nuclear Weapons Council, and my decision now really is pretty much the same. I think it is good the way it works now. I think the reason is that the nature of the stewardship program now, in particular, is very driven by a laboratory system and that is integrated with a weapons production complex.

JOINT RESPONSIBILITIES

It is a self-contained system that really works on the nuclear weapons. The nuclear weapons are not the same as other types of weapons. They are not the same as planes and ships; they are really very unique. The connection between the science we are dealing with and the product at the other end is very, very closely in it; and as we look ahead, if anything, I think that connection is even more close. So it is the relationship between the laboratories, the production complex.

It is a very different system that the Department of Defense runs. They run more of an industrial system where you deal with an industrial capacity that does a lot of things for a lot of different people, does a lot of different services for a lot of different people; and that works fine for the Department of Defense, but I think the nuclear weapons really are so unique and so different that this connection between laboratories and the weapons complex are such that I really would not change it.

I don't know—Jerry, would you comment on that?

Dr. FREEDMAN. Sure. I would agree with Dr. Reis that the system works well, but let me give it to you from a different perspective.

The system that we have affords what I believe to be optimum checks and balances, and it has in the past. The Department of Defense specifies requirements; the Department of Energy agrees to those requirements, usually through a process of negotiation, and out of that, within budget constraints and other considerations, we have produced products.

Now, in the future, this checks-and-balance system will be even more important as we examine this aging stockpile and ask, can we maintain high confidence in it? So I would urge that the—urge you to consider the fact that the system has worked. And we are in a process of change now as far as meeting our new requirement, and this would not be a time to consider shaking the infrastructure out that has let us to where we are and has put us on a success track.

Mr. MYERS. You can't beat success and don't fix it if it ain't broke, but there might be more—the Department of Defense is responsible for the stockpile memorandum, to make the order?

Dr. FREEDMAN. Correct.

Mr. MYERS. It seems to me you are the buyer and you are the seller.

Dr. REIS. That is right.

Mr. MYERS. It doesn't seem to be that clear when we decide about who is responsible for——

Dr. REIS. It is a joint responsibility. Like in any buying and selling relationship, if you are selling something, you really want to please the buyer; if he is buying something, he is willing to negotiate in terms of what he wants to buy, like buying and selling a car. You are both basically involved in that process, and if it is done successfully, you both feel that you have done a good job.

The awkwardness comes, I think, through the fact we are sitting in the Energy Appropriations Committee and when you decide how to do the trade-offs—we are in the Energy Department and we have different trade-offs within that Department as well.

So I won't say it is necessarily the smoothest of relationships. When you think of the alternative, though, I don't think you come up with anything better.

JOINT RELATIONSHIPS

I would say, Mr. Chairman, that both the Department of Defense and the Department of Energy over the past two-and-a-half years have really looked hard at this particular relationship. We haven't taken it for granted.

My first nuclear weapons meeting, sitting on this side, John Deutch said, let's look at this problem; because when he first came to the Pentagon back in the 1960's that was a question that was asked again, shouldn't we really look at this problem?

So it has not been something that we have said, just because it is working basically, isn't there a better way? What we have tried to do, however, is fix those parts where, in fact, we could—like we started this discussion with you asking about the plan we are doing—instead of writing separate plans and our just writing a plan and turning it over to the customer and saying, did you look at it, and his coming back, we did it jointly because we felt that was a more appropriate way to operate.

Mr. MYERS. Mr. Bevill?

Mr. BEVILL. Thank you, Mr. Chairman. Mr. Chairman, as you know, we are in a tight timeframe here.

Mr. MYERS. We have a vote on and he cannot be back.

Mr. BEVILL. Then we have a conference committee immediately following the vote.

I just want to say, Dr. Reis, welcome back; and we are delighted to have the opportunity to work with you. And, Dr. Freedman, we are pleased to have you. You have been with us before, but in another capacity as I recall. And, Ms. Rohlfing, we are pleased to have you with us.

Dr. REIS. It is not clear whether that is a promotion.

Mr. BEVILL. She deserves it. But I have several questions here, and I am going to submit my questions on the record for your answers; and I shall appreciate your answering on the record.

Thank you, Mr. Chairman.

Mr. MYERS. Well, thank you. We do have a conference over with the Senate, trying to keep the country running over the weekend, so some of us may be leaving from time to time.

Mr. BEVILL. They would be in favor of that.

Dr. REIS. Keeping the country running or leaving?

Mr. MYERS. A couple of years ago, I was speaking out at Purdue one evening. And we had a CR coming up, and I took a private plane to go back, and I said, otherwise, the country will close down tonight and the people—they were glad to see the country closed down.

I will stay a little bit longer. Our colleague Mac Thornberry has some questions that I will put in the record for you to respond to. He is not a member of the committee.

TRITIUM SOURCE

Mr. MYERS. Speaking of the dual track, is it on track now, the study?

Dr. REIS. Yes, sir, it is on track. And, again, I would also, from our perspective, we are working the W76 I mentioned that is the TRIDENT warhead. [Deleted.] We started that one first to get it going. We are working with both Livermore and Los Alamos; it has the active involvement of the Department of Defense. The project officers group are involved.

Jerry, do you want——

Dr. FREEDMAN. You are referring to the tritium dual track?

Mr. MYERS. Yes, the dual track of the tritium production.

Dr. REIS. Oh, I am sorry. There are so many dual tracks.

That is going ahead in terms of the accelerator production of tritium. The front end, which was one of the critical areas in terms of producing the protons, has worked; in fact, it is working better than we expected. It is working on schedule in terms of the commercial light water reactor.

We have had interest from some 11 different utilities. We are in the process of getting a memorandum of understanding signed with the Nuclear Regulatory Council, who will be working with us to ensure that that process is done safely and properly. So that is moving ahead rapidly, sir.

Mr. MYERS. It is going to take another two years for the Secretary to make a decision? I didn't know it was going to take that long to make a decision, to get off the two tracks onto the one track.

Dr. REIS. Let me back off for a second because, in truth, there are three, there are two tracks plus a basic contingency. And we feel it is important, by the way, to take that time to be able to make the right decision, and still be able to meet the requirement laid on us by the President on March 11th.

Mr. MYERS. What has happened to this committee and others, Mr. Bevill and I have served with seven Presidents, seven different administrations; and things like this happen when you change administrations—I am not saying that it may happen or may not happen—and then you go back to square one. And some of these things have overlapped from one administration to the next and never get done; that concerns me.

Dr. REIS. I think that is a justifiable concern.

What I think we have tried to do with the dual track is to, if you will, try to make ourselves so that we would not be susceptible to that particular concern. The issues with the light water reactors, of course, are not technical. They have to do with the ability to get through the regulatory and legal hurdles of that. And that is the only way to try that is to go out and try one and make sure that we can get through all of those. That is not something you can do in the abstract.

But that will take time because you are dealing with—this would be the first time that tritium would have been made in a civilian reactor.

Mr. MYERS. And that has to go through NRC; is that right?

Dr. REIS. We are working with NRC. It is not clear that one legally has to do that, but we think it makes sense. When you are dealing with commercial light water reactors, they will be involved at some stage, and I can give you for the record—we will go through that for you in some detail in terms of where we are.

[The information follows:]

DUAL-TRACK TRITIUM PRODUCTION PROJECT

The Dual-Track Tritium Production Project is described in Chapter VI of the Stockpile Stewardship and Management Plan which we will submit to Congress on April 15, 1996. It describes the major milestones and when they will occur for each path from FY 1996 through the first year of production. It also presents the basis that will be used to decide which approach will become the primary production capability as well as when that decision will be made. Except for a $25 million reallocation in FY 1996 that was effective after issuance of the Plan, the status of each path is consistent with the planned activities discussed in the Plan.

Mr. MYERS. Of course, Mr. Bevill and I are not going to be here, but we are still concerned. It is our country; our children and grandchildren are going to grow up here.

Dr. REIS. It is important to get that on the record, so that you understand. I am sure that there will still be a committee here; the process will be the same. And it is important to get that going, and that this committee gets an opportunity to understand where we are going in both of those programs.

Mr. MYERS. Well, some of us are still concerned about verification of the weapons system, the reliability. We all know that these weapons systems have a little different deterioration problems than conventional weapons have, and we are not doing underground testing now. Two administrations have made that decision that we are not going to test underground, that is a foregone conclusion. But this committee, while we didn't make judgment on NIF, are we far enough along to go to production, to go actually into construction?

Dr. REIS. We believe we are on schedule in terms of the work we have done on preliminary design. We hope we will be on schedule for a construction title, which means a Title II by the end—I believe it is October of this year. And so we will be able to make that decision, yes, sir.

Mr. MYERS. We will have an appropriation bill out by then, so how are we going to handle that? What do you recommend that we do? Fence——

Dr. REIS. Yes, sir.

Mr. MYERS. It is on schedule?

Dr. REIS. It is on track; it is on schedule, yes, sir. We went through—there was a concern, as you remember, last year we talked about in terms of what its effects were to be for nonproliferation. We went through a detailed analysis of that, independent analysis, very much like a NEPA process with a scoping hearing and a draft document; and that was commented on by the public.

The Nonproliferation and National Security Office, Joan—Ms. Rohlfing did that analysis. That came through and caused a delay of essentially a week or two. We were able to get through that with flying colors, and I believe we are right on schedule.

Mr. MYERS. I am sorry the committee will have to stand in recess for two or three minutes until one of the members gets back.

Here, he is back now. We will not have to recess.

Mr. KNOLLENBERG [presiding]. Let me pick up my pieces and get to the chair here. This may be an up-and-down kind of a situation for a bit, but we have not one vote, but two. And so I am going to chair until Mr. Myers returns, and then maybe he will vote twice and I will vote once again.

Dr. REIS. You could give him your vote?

Mr. KNOLLENBERG. They frown on that. In fact, they frown on proxy voting, too.

Let me direct my first question toward Dr. Reis. It has to do with tritium, and I know that Savannah was originally designated as a spot where we were going to produce tritium. Apparently that is not going to happen now, or you could comment on that. I guess the question I would raise is, how are we going to assure ourselves of a reliable source of tritium?

TRITIUM SOURCE SITE

Dr. REIS. Well, let me get back to your first question. If we choose the accelerator production of tritium, if we go down that particular track, Savannah River has been chosen by the Secretary as the preferred alternative. Again, if we made that decision, Savannah River would be the place to produce that. It is an area that has a lot of infrastructure for tritium.

We have a contingency plan, a contingency approach, which would use a commercial light water reactor, and we are going ahead to ensure that the type of targets for light water reactors will be in place. We will be testing those. We will have an extraction facility, which would be at Savannah River. We are going ahead with that.

So if there is a national emergency, if for some reason or another we need tritium in a relatively short period of time before 2005, or something happens sometime in the future, we will always have that ability to move in a year or so, or a year-and-a-half or two years, to actually produce tritium at the rates that we need. So that is the underpinning, if you will, of our strategy.

Now, the reason we are confident about that is that we feel that in a national emergency any legal or regulatory barriers that might be thrown up to commercial light water reactors might be overcome. But we know in the absence of a national emergency we can expect those types of barriers, and we think we will overcome them; but that is why one of our tracks is a commercial light water reactor going through the normal process. If they do show up and they are a problem, we have a second track which is an accelerator production of tritium. It is not a reactor and it doesn't produce any high-level waste whatsoever, but one would expect that it would cost more.

So that is why we are, if you will, running on both of those tracks by the year 1998. We feel we will be able to select one of those, and the other one would remain a backup in the event of any problems with the single track that we would be trying.

Mr. KNOLLENBERG. Apparently the concept of a privatized multipurpose reactor was discarded. There were three possibilities, were there not?

TRITIUM ALTERNATIVES

Dr. REIS. Actually there were a number of possibilities. We looked at heavy water reactors at one time. We have looked at high temperature gas reactors. We have looked at advanced light water reactors. And we have looked at accelerators. And, of those, we felt that if we were going to go to light water reactors, we would be better off with a commercial light water reactor; and then if we were— and then the advantages of a light water reactor as opposed to the other types of reactors, one couldn't distinguish them, so we would take a very different—something very, very different. That is why we chose the accelerator.

And as part of looking at the light water reactors, we have looked at the multipurpose reactor, which would—as I understand it, would make tritium, burn plutonium and also sell electricity, and that is not one of our preferred options.

NORTH KOREA

Mr. KNOLLENBERG. Let me turn now to a question, is it Rohlfing?

Ms. ROHLFING. Rohlfing.

Mr. KNOLLENBERG. Knollenberg is not easy to pronounce either.

Let me get into a question about—specifically about North Korea. I think that was a part of your testimony. I know yesterday Secretary Christopher mentioned, in his words—and I can quote him pretty close—that they stop the North Korean weapons development in its tracks, words to that effect.

Ms. ROHLFING. Correct.

Mr. KNOLLENBERG. And you have got in your testimony here that we have used the word "freezing", too—and I see you have chosen that word as well, "frozen" the North Korean nuclear weapons program and allowed the IAEA to come in and make on-site inspections. That has come about in the last several months.

My recollection of late summer 1995, it was not the case, so apparently in December of sometime last year or the first few months of this year, there were some steps taken to lower the threshold of difficulty or problem. Would you comment on that?

Ms. ROHLFING. Sure, let me describe briefly what the status of our efforts in North Korea is.

We, or course, as part of the agreed framework that the U.S. concluded with North Korea a year ago January, agreed that the U.S., in cooperation with the DPRK, would work to can and store the spent fuel resident at a research reactor in Nyongbyon.

Mr. KNOLLENBERG. Are they doing that now?

Ms. ROHLFING. They are in the process of doing that. We sent our team in in September, and we have had our folks in the ground since September, almost a continuous presence. There was a short disruption of several weeks over the Christmas holidays.

We have clarified and stabilized the water in the pools, and we are just at the beginning of the actual canning process. We will be canning over 8,000 spent fuel elements in over 450 canisters. Once that effort is complete, it will enable the IAEA to safeguard that material at the site until it can be removed and disposed of.

Mr. KNOLLENBERG. Do you feel confident that with the additional technology that has come into play in the last several months that you are in a position to actually pick up activity, not just in North Korea but around the world? Is that technology so sophisticated that we can do it covertly and securely, and we can distinguish between an atom bomb and an earthquake? Maybe that is not a big deal between an atom bomb and an earthquake, but between a discharge——

DETECTION CAPABILITIES

Ms. ROHLFING. You are referencing our ability to detect by seismic means underground nuclear tests?

Mr. KNOLLENBERG. Yes.

Ms. ROHLFING. [Deleted].

Mr. KNOLLENBERG. [Deleted].

Ms. ROHLFING. [Deleted].

Mr. KNOLLENBERG. That might be helpful, because I know you say you have got this equipment, and it is reassuring to hear that you have got it, but if it is not detecting anything, or it is not precise, it doesn't send too much of a secure message.

COMPREHENSIVE TEST BAN TREATY

Ms. ROHLFING. The international monitoring system is not yet in place, because we have not yet concluded a Comprehensive Test Ban Treaty. [Deleted].

DETECTION CAPABILITIES

Mr. KNOLLENBERG. Within what range, say mile-wise, of the particular explosion would you have to be with your current monitoring equipment to make an accurate detection?

Ms. ROHLFING. It depends on the kind of sensor you are talking about, whether it be infrasound——

Mr. KNOLLENBERG. The closest sensor, how close would you have to be?

Ms. ROHLFING. The problem is not the sensors; our seismic sensors are quite sensitive. The problem—the challenge with the seismic sensors—is being able to discriminate between the noise and the signal, because we get many signals related to geological events—earthquakes, if you will, and mining.

Dr. REIS. We pick up mining.

Ms. ROHLFING. There are thousands of mining explosions.

Mr. KNOLLENBERG. And differentiation is difficult?

Ms. ROHLFING. Differentiation is difficult with seismic, which is why it is important to have the other sensors in place. But with the challenge regime that a Comprehensive Test Ban Treaty would give us, should we have any doubt about an activity that is observed—either a seismic signal or any other kind of signal—we could go in with a team and actually try and verify the activity through equipment at the site.

PROLIFERATION RESISTANT REACTORS

Mr. KNOLLENBERG. There was a phrase used by Secretary Christopher, too, and I don't know that it is one he coined; but he talked about, and I will try to remember this, but "proliferation-resistant," nuclear, I think it is, light water reactors. It may not be. But I do recall "proliferation-resistant". And I can think of resistant caps on the top of a pill bottle or something.

Resistant is the key word here. What does it really mean? Resistant is less, of course, than what it was before, but you certainly haven't eliminated the problem. What really does that word mean and are you familiar with the phrase?

Ms. ROHLFING. I am not familiar with the quote that you are referring to.

Mr. KNOLLENBERG. I could get that for you, by the way.

REDUCED ENRICHMENT RESEARCH AND TEST REACTOR PROGRAM

Ms. ROHLFING. I would appreciate that. But what I imagine he is talking about is our effort to try and encourage European partners and the Russians to, instead of employing reactors that are run on highly-enriched uranium fuel or plutonium fuel, MOX fuel—we are hoping to move them to a regime where they are basically using low-enriched uranium fuel over time, because of the impact that would have on reducing the stockpiles of uranium and plutonium worldwide. It is these fissile special nuclear materials that are the necessary ingredient for weapons.

Mr. KNOLLENBERG. This question might relate to any one of the three of you. I want to make sure it is for the right area here. If the Department of Energy were to be dissolved as some are talking about, where would you locate the defense programs? Dr. Freedman? Dr. Reis? Any of you? You shouldn't be bashful.

Dr. REIS. That is right. That is a little bit like the "have you stopped beating your wife" question, but again getting back to what we discussed earlier with Chairman Myers, we have looked at that, obviously, and it continues to be looked at; and I think that one could conceive of moving it to—obviously, to the Department of Defense.

One could think of it—if the Department of Energy were to be dissolved as an independent agency, at one time as, you know, it was essentially the Atomic Energy Commission. Then it became ERDA, which was an agency as well. And then it became—if you will, it grew up and became the Department of Energy.

Wherever it goes, I think it is important to retain the independence of the defense programs. The work that we are doing in terms of nuclear weapons, just a normal activity in the Department of Defense. Again, that is my personal opinion, that the independence, the customer-buyer-seller relationship has really served us well. Particularly as we go into an era where there is likely to be no underground nuclear testing, I think it is more important to maintain that customer-seller relationship.

Ms. ROHLFING. I would like to just add to that. I have trouble with the premise of the question, and let me tell you why.

When I look at the program activities in the nonproliferation program, most of what we do is built on the foundation of expertise and infrastructure resident in the Department of Energy's laboratories. And robustness, the vibrancy of those laboratories is very much dependent on their multipurpose, multiprogram function. And by multiprogram, I mean they are not just defense laboratories.

I think a significant part of the budget for what we call our national defense laboratories is now in the area of civilian research, and there is an important synergy there. And if you tried to move those laboratories to the Defense Department where they would become single-purpose and defense-only-related laboratories, I think you would badly damage the foundation upon which all of the Department's weapons and nonproliferation activities are based.

So I would argue that, for that reason, we should not contemplate trying to move the functions, even the defense functions.

Mr. KNOLLENBERG. So you have some problem with making a move of that kind?

Ms. ROHLFING. I have, yes.

SECURITY OF NUCLEAR MATERIALS AND EXPERTISE IN THE FORMER SOVIET UNION

Mr. KNOLLENBERG. Let me get into Russia just a little bit. I have a little time here, so we can expend that.

I think it was you that commented about the situation in Russia. And I don't think any of us are confident—many of the members of this committee have gone to Russia and Chernobyl and other locations around the world to look at some of the situations. We are concerned about security.

Are you? And if so, what within your scope are you contemplating our doing about it? First of all, just an analysis, where you think we are with respect to Russia.

Ms. ROHLFING. We, of course, remain concerned about the security of nuclear materials and expertise in the former Soviet Union and, hence, my bringing the chart today that showed where——

Mr. KNOLLENBERG. I had a hard time reading that.

Ms. ROHLFING. You don't need to read it. There are a lot of dots on that chart, and that was the main point that I was trying to make. The DOE has agreements in place at over 35 different locations within the former Soviet Union where we are assisting with improving the security and accounting and protection systems.

I would be happy to——

Mr. KNOLLENBERG. Is that Kazakhstan down in the lower left-hand corner?

Ms. ROHLFING. Yes, it is.

Mr. KNOLLENBERG. To me, it looks like an island in the middle of nowhere. Go ahead.

Ms. ROHLFING. We will bring it closer so that you can read it.

Mr. KNOLLENBERG. Great, thank you. I appreciate that.

Ms. ROHLFING. What you see broken out across the bottom are the different sectors with which we are cooperatively working. We are working the Ministry of Atomic Energy, both their defense and civilian sectors. We are also working with their naval nuclear sector. We are also working with other civilian institutes, research institutes among them, and we also obviously are working in the other NIS states outside of Russia.

We—I might just note that we have made very significant progress over the last year with securing these materials. We are now engaged at over—I want to say about 75 percent of the sites across the former Soviet complex.

I might also note that while that program focuses on securing nuclear materials, we are also concerned about "brain drain", about Russian scientists flowing out, former Soviet weapons scientists flowing out—and going to work for a proliferant nation. And so in order to help address that problem, we have a program through our laboratories and through industrial partnering where we are employing some—actually our metric is several thousand former Soviet scientists, engineers and technicians. They are engaged in scientific work and working with industry in partnership on civilian applications. And we are hoping to help establish some new civilian industries that would give these people some long-term employment prospects. That is going to be the key to keeping them in Russia.

RUSSIAN REACTORS TO IRAN

Mr. KNOLLENBERG. When we were there last summer, we talked about that very subject. And I know that there is a marrying of sorts between the U.S. and Russia in terms of that level of expertise.

We also were told by Viktor Mikhaylov and some others. I suspect he is part of the contact group that is your contact that you are talking to. There is some concern about that because many of the scientists are literally living on nothing, very, very low salaries; and should they be exported to—and the first country that comes to mind is Iran, and I want to ask you a question about that—in your judgment or the judgment of the three of you, where exactly are we today with respect to the nuclear material, reactors that were allegedly sent to Iran?

Are they in fact—and Viktor Mikhaylov himself told us that there is no danger; that wasn't totally comforting, but he said there is no way that will develop into anything other than power for the Iranian people. But we know that they have all the power they need with respect to gas and oil; we wonder what they need a nuclear reactor for.

And so in the judgment of any one of you—I haven't called on you, Dr. Freedman, you can shoot at this one if you want to, unless that is out of your bailiwick.

Dr. FREEDMAN. I think this is out of my bailiwick.

Mr. KNOLLENBERG. I don't want you to feel overlooked here.

Dr. FREEDMAN. I will speak up if I feel I am being overlooked, sir.

Mr. KNOLLENBERG. Very good.

Ms. ROHLFING. I am not current on the exact status of that transaction. It obviously has not proceeded at the anticipated rate. It is not something that my program has actually been closely focused on. We would be happy to take that for the record and get you some more information.

[The information follows:]

STATUS REPORT ON THE RUSSIAN REACTOR SALE TO IRAN

After a year spent discussing financing and surveying the existing structures at Iran's Bushehr nuclear power plant, Russian teams began work on completing the facility in January, according to Russian press reports. In early March, Russian Minister of Atomic Energy Mikhaylov said that, in addition to completing the rector, his ministry also will provide training for Iranian nuclear specialists. Two weeks later, Russia's ambassador to Tehran said in an interview that the two countries plan to extend their nuclear cooperation after Bushehr is finished—a claim that Ministry officials subsequently denied. (U)

[Deleted.]

Overall, completing the Bushehr nuclear power plant is a huge undertaking. Germany's Siemens started building the first and second units at Bushehr in 1975, but the project was suspended by the German government four years later after the overthrow of the Shah. The partially completed facility subsequently was damaged during the Iran-Iraq war. (U)

[Deleted.]

Mr. KNOLLENBERG. I appreciate that.

NORTH KOREA

[Deleted.]

Ms. ROHLFING. [Deleted.]

SECURITY OF RUSSIAN COMPLEX

Mr. KNOLLENBERG. I think I have touched on some of this already, but in the Soviet Union—and I am no one to make a judgment about this, but it was the belief—the shared belief of most of the group and some of the advisors that we talked to that the security system in Russia is one that you have to question, too, in terms of what they are doing about any of their nuclear supply. And I am wondering if we have any assessment at all of what the potential problems in Russia are, or if they even know.

With the breakup of the Soviet Union and the various republics—Kazakhstan being one that I know was the site of a whole lot of nuclear activity in terms of testing, et cetera, not to mention wherever else; and since they have spun off, for the moment, those republics and they are independent, the connection or contact they have is probably somewhat slight. But looking at Russia proper, do you have a view or a feeling, a concern? How would you express your feelings about Russia, in particular?

Ms. ROHLFING. I would observe the following: As I mentioned earlier, we do have concerns about the security of the Russian complex, especially where materials are concerned. I remain optimistic looking at not only the progress that we have made in the last year, but the actual change that we are seeing in the Russian security culture. The Russians recognize that they have a problem.

Their old system, the Soviet system, was a system very dependent upon personnel security and "low-tech" things like guns, guards, gates and dogs. The U.S. security culture is much more reliant upon technologies—upon accounting systems and tracking systems, and perimeter/portal monitoring. We have been working with Russians to put in place a security culture that looks much more like our own.

First of all, they are very receptive and are promising progress. President Yeltsin issued a presidential directive as early as September 1994 on improving nuclear material security. There have been several laws subsequently drafted in Russia to address these needs. At the grassroots level—at the facilities level where these materials are located—there are people who are eager and have been approaching the U.S. to try and participate in this program to help improve the security on the ground.

So we see from as high as the presidential level down to the grassroots level some real progress.

UPCOMING RUSSIAN ELECTION

Mr. KNOLLENBERG. This may not be a fair question, and if it isn't, you can just tell me, but you mentioned from the presidential level on down in Russia, and as you obviously know, they are in the middle of something right now. After the Duma election, they have a presidential election and it isn't at all sure that Mr. Yeltsin will be the president. Looking at the alternatives, a couple of them are not too acceptable in some circles.

What does that do to this movement that you have talked about and seems to be progressing and succeeding? What will that do, in your judgment, if Mr. Yeltsin doesn't return?

Ms. ROHLFING. I think that is very difficult to predict. We are obviously watching that very closely, and we have concerns.

I might add that one of the reasons we have been so successful is that we are working at multiple levels, including the grassroots level with each of those five different sectors. We are not just working top down through the government. We are going directly to sites and directly to people throughout the complex. And because of that, I remain optimistic that even if there is a change at the highest levels of government, that we will be able to continue this cooperative program. But there are no guarantees, and we are watching it very closely.

Mr. KNOLLENBERG. I understand that, and as I say, the question is not exactly asked with the idea of your coming through with an answer that is going to give us the future here in a moment.

Dr. Reis.

TRIPLE-PLAY REACTOR

Dr. REIS. Mr. Chairman, you asked about the triple-play reactor, I wanted to make sure we got that question clarified exactly right because it is an issue that keeps coming up. We have rejected, in our selection of the dual track, a new triple-play reactor that would be built at Savannah River or anywhere else that would make tritium, sell electricity, and dispose of plutonium.

However, in our discussions about the commercial light water reactor, we have asked those people if they would be interested or would it be possible for them to burn the MOX fuel at the same time.

So at some time if a need—again, there are a number of ifs that go along with that. The whole concept of triple-play has not been discarded, but the specific idea of building a new one at Savannah River or any other place is a specific option that we have rejected at this time.

Mr. KNOLLENBERG. I am going to take just one moment and suspend, and maybe one of the staff can call and see what is happening. It occurs to me that the two votes I was told haven't happened—one has, and the other hasn't, and I am wondering if there is a delay that I should be aware of, that my beeper is not working.

Nothing has happened up there. So just to make sure that all of you understand, I didn't advise those people to disappear for two votes and never come back. They will be back. I assume something happened in the interim.

Dr. REIS. We are not going anywhere.

POTENTIAL FOR TERRORISM

Mr. KNOLLENBERG. I have asked about the *Popular Mechanics* story that appeared a few days ago as to the problem of some rogue state or some bandits, worldwide bandits that get together and can, with various material, construct a nuclear bomb. And that has got to be, of course, part of the concern of what you do every day. And so I just wonder in a moment or two—and you can pick upon yourself or point fingers at each other—how large is that threat?

Popular Mechanics is not exactly the *Bible* on that kind of thing, but it is obviously of interest to people. They read about it, and we hear about it. What chances are there for a rouge state—and we have several of those—or for some international terrorists—and we have more of them—what possibility is there that they could be the first on their block to construct one of these devices and use it in a way that would be horrendous for the whole world?

Ms. ROHLFING. I wouldn't want to assign a probability to it, and I am noting that my colleagues are not wanting to jump right in here. But suffice it to say, we are very concerned about that prospect. And it need not necessarily be a rogue nation; it might be a terrorist organization. And it might not and need not be nuclear; it could be a chemical or biological threat.

We are very concerned, and that is the basis for many of our nonproliferation programs: securing the nuclear materials to help prevent the theft or acquisition of the key ingredient to any nuclear bomb, securing the expertise through our industrial partnering program, as well as some work for others in the chemical and biological area that the Department of Energy's laboratories do for the Defense Department.

So it is certainly one of the concerns underlying—it is an integrating factor for everything that we do in the nonproliferation program.

Dr. REIS. Let me add that one of the important parts of the Stockpile Stewardship and Management Program is our response teams, our nuclear emergency support teams. They originally developed a number of years ago primarily in terms of accidents, what would happen in terms of a nuclear accident or how to avoid an accident; and if something happened, how to work with the local police, firemen, to, you know, minimize damage. That has gone on for a number of years. The reason that is essentially an all-volunteer force of the people working in the laboratories, who are experts, is because people are not used, obviously, to dealing with nuclear weapons, to help detect, find something. In the past, they have also been involved in concerns about extortion—somebody has one, and that sort of thing.

Well, over the past few years we have really turned much of our attention to supporting, really, a group working within this country and working within the Department of Defense, and State in terms of out of the country, and the FBI in terms of dealing with what would happen if, and how we deal with this.

I spent close to four hours yesterday testifying with Senator Nunn and Senator Lugar in hearings in terms of what we are doing as a Nation to support that, and so there is no question how much concern we have, particularly again from the Defense Programs perspective in supporting our work against nuclear terrorists both in this country and abroad as well.

Dr. FREEDMAN. Just to add a slightly different spin to what Ms. Rohlfing said, at the national weapons labs, as we develop the stockpile stewardship tools, the above-ground experiments and the computer codes, what we gain out of that as a by-product is the ability to examine with fairly high fidelity what a rouge state or what other nations can do.

So I think it is important to note that there is strong interaction, as you alluded to, and we—it is very easy to then ask our own experts that question and have them evaluate that with higher precision than we would be able to evaluate it if we didn't have this type of program.

DECLASSIFICATION

Mr. KNOLLENBERG. Is the fact that we are declassifying a lot of information, documentation, as more information becomes available to the general public, is that adding to and creating a stir of concern? That was alleged in one of the columns that we glanced at as well.

Ms. ROHLFING. My office is responsible for the declassification initiative——

Mr. KNOLLENBERG. And let me make it very clear that that was just raised. I don't think that was motivated by any documentation at all.

Ms. ROHLFING. We would like to keep it that way, actually.

We have, obviously, very strict criteria that we measure our decisions to declassify a document against. And we are expending a great deal of effort to make sure that everything is reviewed before it gets declassified so as to avoid exactly that problem where something would be inadvertently released that ought not to be released.

Mr. KNOLLENBERG. That is reassuring. And I want to again say that that was something that was raised and has been raised in a number of articles.

I am going to, I think, suspend for just a moment or two. What we should probably do on the advice of counsel is simply to adjourn. I understand there is a conflict for the Chairman, and if the Chairman does not return, it kind of puts us at bay. So I think the recommendation should be accepted that we adjourn.

I appreciate the testimony of all of you. The only apology, Dr. Freedman, is that I didn't get to you as much.

Dr. FREEDMAN. I am sure there will be questions for the record.

Mr. KNOLLENBERG. There will be, and I plan to submit some. That has been covered. We look forward to your responses to those, and we thank all of you for appearing here today.

With that, we will adjourn until tomorrow at 10:00.

[Recess.]

NORTH KOREA

Mr. MYERS. I am sorry to have to call you back. Mr. Fazio had some questions that he wanted to ask. This is double jeopardy.

North Korea, for sure; have we covered that?

Ms. ROHLFING. We did somewhat.

Mr. MYERS. The original request that you made for the reprogramming over a year-and-a-half ago was for $10 million and with some assurance to all of us that that would be all the money that would be required, there might be slight cleanup at the end, something that you didn't finish.

And then you came last year, for $2.5 million last year——

Ms. ROHLFING. $3.6 million.

Mr. MYERS [continuing]. On top of the $10 million, $3.6 million. Now you are requesting again this year for more.

This committee was the last one to come on board, and I think maybe we were right in the first place. We went over last year to take a look, see how our taxpayer money was spent, and we were not allowed to come and see how the taxpayer dollars were being spent. As far as I am concerned, our job is finished.

Ms. ROHLFING. I will come to the funding issue momentarily. But let me start by putting North Korea in perspective.

Mr. MYERS. We have to be out of here in about a half-hour.

Ms. ROHLFING. I can do it in a lot less than half an hour. I want to remind the Chairman that we have 22,000 U.S. service people in North Korea.

Mr. MYERS. 22,000?

FUNDING FOR NORTH KOREA

Ms. ROHLFING. [Deleted].

I was not present when members of the Department came before this committee last year requesting the $10 million reprogramming, but I am advised that at the time we came forward and outlined the initial $10 million request, we highlighted that there were uncertainties in that budget estimate. That was our best estimate at the time, given scant information about the status of the reactor, about the level of corrosion that we observed and about our ability to, frankly, get on the ground quickly and begin work.

It was based on two one-week visits to North Korea to take a look at the spent fuel in January. So a year ago January, between those initial visits and the time that we actually were able to get a team into North Korea in September, we saw a difference between one inch of corrosion, in terms of sludge on the bottom of the reactor pool, and eight inches—six to eight inches by the time we got there in September.

We have encountered a number of circumstances which we could not have anticipated at the time that we initially put our budget estimate together. For example, the increased amount of sludge required us to reengineer the sludge vacuuming equipment that we needed, because what we brought in initially was not fit to do the job.

We have had additional technical challenges and have had some very good people on the ground doing yeoman's work in very adverse circumstances. The spent fuel building that they are working in doesn't even have heat. We have had to bring a big boiler in to set that up and try to get that building heated.

The racks that we are using to do the canning, the actual canning, were built to specifications—the actual blueprints for the pools. We discovered when we put the first rack in that it didn't fit, not because we had built it incorrectly, but it turns out the pool was not exactly built to the blueprint that we had.

There have been all sorts of challenges like that that we have dealt with on literally a daily basis. We have not been able to work the full 12 hours a day that we had hoped for initially when we made the budget estimate; we have only been in there, on average, about 7 hours per day.

Mr. MYERS. Why is that? Why only 7 hours when you planned 12?

NORTH KOREAN COOPERATION

Ms. ROHLFING. It has to do largely with the North Korean culture and it has to do with the terms of the Agreed Framework.

I need to remind you that we are doing this on a cooperative basis with the North Koreans. Every morning we go in and negotiate with the chief engineer at the site the activities that will be performed that day. That takes time. There have been power outages on a regular basis. That shuts down work for periods of time, sometimes hours every day.

Nevertheless, I do need to emphasize that the North Koreans are cooperating. We are making progress. We did our first can—canned our first spent fuel element—now several weeks ago. We are installing the rest of the equipment so that we can start the full-up canning process within the next couple of weeks. But, again, every day is a challenge, and there have been lots of things that we have encountered that we didn't, nor could we have, anticipated.

I also need to remind you that once we have completed the canning, we will need to maintain some ongoing presence. We will need to go back and monitor those cans to make sure that there are no leaks; and we will also need to do some fuel characterization to help us determine how best to dispose of the fuel once we can get it moved out of North Korea. But if we were to stop that work now, before this year is out, or even at the end of the fiscal year, before the job is completed, we would be putting in jeopardy the very significant progress we have made in freezing that nuclear weapons program.

Mr. MYERS. Well, I am not very pleased as one member of this subcommittee. Once again, it seems that we have been misled, and the lack of cooperation that we received from the North Koreans——

Ms. ROHLFING. Sir, the North Koreans have been cooperating.

Mr. MYERS. It doesn't sound like it. If you planned 12 hours and you can get only 6 or 7 hours, is that cooperation in your view?

Ms. ROHLFING. I would describe it as a cultural difference. But they are most definitely cooperating.

We continue to make progress on this very important task, and I think the additional millions of dollars is, frankly, a very small price to pay for the very large national security gain that we get that has immediate benefit to the U.S. and U.S. soldiers stationed in Korea.

U.S. SOLDIERS IN SOUTH KOREA

Mr. MYERS. What threat is there to a U.S. soldier on the DMZ when it is 40 miles away from there, because the sludge is settling down in the pool? Who has the greatest risk?

Ms. ROHLFING. Sir, the threat would be if the North Koreans—if we were to leave today and the North Koreans were able to reprocess that spent fuel to extract the plutonium and to construct it into weapons.

DISPOSITION OF NORTH KOREAN SPENT FUEL

Mr. MYERS. All we are doing is canning now. I asked for assurance that we would get the spent fuel. We never got that assurance. As part of the agreement that we would go along with the original $10 million, we wanted an understanding that we would get the fuel and move it into South Korea and dispose of it that way. We have never been given that assurance. Do we have that assurance now that we are going to control the fuel after it is canned?

Ms. ROHLFING. In the Agreed Framework, there is an agreement that that fuel will be removed and disposed of. It will be taken out of North Korea. The actual timing of that removal is pegged to certain other activities occurring. It is pegged to progress, most notably in the conclusion of the KEDO negotiations and the delivery of key light water reactor components to North Korea. But we do have agreement to move that fuel after delivery of key components to North Korea.

Mr. MYERS. We will control that move? That is the first time I think we have been assured of that.

Ms. ROHLFING. I may be misunderstanding you when you say "control that move," but it is most definitely part of the Agreed Framework that the fuel will eventually come out of North Korea and will be disposed of.

Mr. MYERS. Would you provide for the record just where that is?

Ms. ROHLFING. Sure, I would be happy to.

Mr. MYERS. And how it would be facilitated?

Ms. ROHLFING. I would be happy to.

[The information follows:]

[Deleted].

REMOVAL OF SPENT NUCLEAR FUEL FROM NORTH KOREA

The provisions for removing the spent nuclear fuel from the Democratic Peoples' Republic of Korea (DPRK) are contained in the Confidential Minute to the Agreed Framework. [Deleted.]

DISPOSITION OF NORTH KOREAN SPENT FUEL

Ms. ROHLFING. As I said, the details on the timing of that remain to be negotiated, remain to be completed, but it was part of——

Mr. MYERS. Now you are backing up, talking about it has to be negotiated.

Ms. ROHLFING. No, I am not backing up.

Mr. MYERS. What do you mean, it has to be negotiated?

Ms. ROHLFING. The timing, the actual timing of the removal has to be negotiated. But I also need to note that once the canning is completed, the IAEA will be maintaining safeguards to ensure that that fuel—that the canned fuel has in no way been tampered with or moved until such time as we actually take it out of North Korea.

ACCESS TO NORTH KOREAN SPENT FUEL

Mr. MYERS. Do we have any assurance now that we have access to all the fuel? Remember, we have seen pictures here of where there was possible other storage in the proximity of where it is now stored. Are we sure we know where all the fuel is today? Are we going to have access to all of it, spent fuel?

Ms. ROHLFING. The spent fuel from the research reactor—the bulk of it is in the pool. There is also some that is in dry storage that we have not been able to get close enough to so that we can understand exactly what shape it is in.

Mr. MYERS. Why haven't we gotten close to it to find out what the condition is?

Ms. ROHLFING. That is something that remains—we have been told by the North Koreans that we would be given access to that and that we would be allowed to begin canning the fuel in dry storage once we have begun the actual canning of the fuel in the pool.

Mr. MYERS. We haven't started canning that yet?

Ms. ROHLFING. The very first can—we did a test can approximately two weeks ago while we were putting the other canning racks and the canning stations in place. Well, we are presently putting the other stations in place and expect to begin the full-up canning within the next couple of weeks.

Mr. MYERS. I am uncomfortable with what is being done there. I guess I am the only one that is.

Ms. ROHLFING. Sir, I would hope that you would be reassured that we are making progress there. I personally would be much more uncomfortable if we had no presence there and if the North Korean program was proceeding unabated.

Mr. MYERS. I would be much more comfortable if we were certain we were getting all the fuel and were having cooperation. It may be a cultural difference. If we don't put the money in it, would that be considered a cultural difference? If we don't put the money in for it this year, do we have a cultural difference of opinion? I can't buy that if we are going to pay for that. Our personnel were supposed to go over, and we were going to put people there to do it.

Ms. ROHLFING. And our people are there, but the terms of the agreement were that we would do this jointly with the North Koreans; and we are doing this jointly in cooperation with the North Koreans. The terms of the agreement did not allow us to come in and usher them all out and take over the site. The terms of the agreement allow us to go in and work cooperatively with them to can the spent fuel.

Mr. MYERS. Even if it takes 25 years?

Ms. ROHLFING. We are obviously not anticipating that it would take anywhere near that length of time.

Mr. MYERS. You didn't anticipate any of this extra time. I think there was a condition, if we have something, it might run another million dollars or so. Now I don't think there is any end in sight, the way it sounds to me, if you haven't even started canning yet and we have spent $13.5 million.

Ms. ROHLFING. We have only been there since September, and we have encountered a lot of challenges. And I just need to reaffirm one more time, we are making progress and this is important work.

TOTAL COST FOR NORTH KOREAN EFFORT

Mr. MYERS. If I ask you what it is going to finally cost to get the job completed, do you have any idea?

Ms. ROHLFING. That is a question I would like to take for the record. What we could do is give you an analysis based on—I could give you a range and I could try and outline for you the assumptions upon which our estimates are based. And I could also try and bound the problem for you by highlighting the uncertainties that will affect the ultimate cost.

[The information follows:]

[Deleted].

TOTAL ESTIMATED COST TO COMPLETE SPENT FUEL CANNING IN NORTH KOREA

The DOE estimate of the cost to complete spent fuel canning work in North Korea is $9.5 million. This is in addition to the $13.6 million appropriated to date. The breakdown of the $9.5 million is $4.1 million from June 1996 through September 1996 and $5.4 million for fiscal year 97. The canning operation is estimated to be completed in March 1997. Follow-on activities will be required in FY 97 at an estimated cost of $2.5 million. In the out-years, it is estimated that $2.5–5.0 million per year will be required for post-canning maintenance until the fuel is removed from the DPRK. The estimate to complete canning is based on the following assumptions.

ASSUMPTIONS FOR DOE ESTIMATE

No major breakdown in mechanical equipment.

Democratic Peoples' Republic of Korea (DPRK) will provide qualified staff to operate the overhead crane and other DPRK equipment, but may not provide the number of qualified workers to man all the canning workstations.

Four canning stations will operate simultaneously.

The canning stations will process 48 cans per month.

U.S. workers will be allowed to work approximately eight hours per day during fuel canning.

Up to six work days will be lost each month to DPRK holidays or other downtime.

All mechanical systems will require maintenance.

Special handling will be necessary for the fuel rods in dry storage.

Site shutdown will take one week after the completion of fuel canning.

There is no major political or diplomatic breakdown that affects the operation.

UNCERTAINITES WHICH COULD AFFECT COST AND SCHEDULE

Dry Stored Fuel.—No one from the U.S. has seen any of this fuel, some of which is known to be significantly damaged. Conceptual procedures for handling this fuel have been discussed with the DPRK, but no agreement has been reached. We have estimated it would take one month for special handling of this fuel, but the actual time required is not known at this time.

The U.S. Spent Fuel team has developed an action plan to process the dry fuel without having viewed the fuel elements or the fuel baskets. The plan has been reviewed by fuel experts within the U.S. and with international experts to ensure safe handling as it is transported from a dry storage pit to the pool where it will be stored until it is canned. The danger associated with dry MAGNOX fuel is its potential for hydride fires when exposed to the atmosphere of the reactor storage building during movement from storage to the pool.

Just recently, the DPRK has begun to discuss the 800 dry stored rods with the U.S. team. The plan for health physics, movement, inventory and identification of the fuel elements must be agreed to by the U.S. Team and DPRK before execution. If special equipment or materials are required, it will increase the cost and extend the schedule.

Accident, Injury and Radioactive Exposure.—To date, the U.S. spent fuel team has maintained a good safety record. However, if an accident or injury occurs or if our experienced U.S. workers reach maximum radioactivity levels, they must be replaced with workers that may be more inexperienced with the DPRK project and culture.

Equipment Damage.—If one or more major pieces of equipment are seriously damaged, both cost and schedule will be impacted. Costs impacts would include repair or replacement, package, license, and transport on to the DPRK.

Fuel Rod and Equipment Problem.—The estimate is based on 48 cans completed per month. However, the U.S. team has only examined a few of the 8,000 rods. Technical problems with the fuel could occur. This could impact canister capacity. Based on the first 22 rods which have been examined, we do not anticipate problems with capacity. Also, fuel rod problems could potentially cause damage to the fuel conditioning and handling equipment. This would impact the canning schedule and cost.

Political or Diplomatic Problems.—We have already had one period of U.S. team absence from the site because the DPRK government stopped granting visas to our team members. The possibility of similar or more serious problems in the future cannot be elimated.

U.S. Team Morale.—The U.S. spent fuel team has done an excellent job to date under very difficult circumstances. However, the schedule for completing this work has grown and these technicians will be needed on the project into 1997, much longer than originally anticipated. Already, U.S. team members have missed holidays and extended periods of time with their families. This work cannot be completed without U.S. technical assistance and it is imperative to maintain the commitment and enthusiasm of the U.S. team to this project.

Mr. MYERS. Well, I am very uncomfortable with it. I don't know about the rest of the committee. We will discuss it.

One last question on my part. I see Mr. Fazio is here now.

This is double jeopardy, Vic. They started to leave, and we caught them just as they went toward the door.

How can we afford all the labs we presently have? How many labs do you run?

DEFENSE LABORATORIES

Dr. REIS. I think the question is, what is the job that we need to do and is there a better way to do that?

If one looks at the responsibilities that we have been given, which are to maintain the safety and reliability and the performance levels of the current stockpile indefinitely, without testing, that is one tough job; and the only way we can do that, that we know, is to work with the two laboratories.

Mr. MYERS. Why do we need two?

Dr. REIS. Because I need one to continually work to test the other one, if you don't have nuclear testing. I have got to maintain this challenge.

Can I give you an example of how we are doing it?

Mr. MYERS. Of course.

Dr. REIS. Because I wanted to get on that one. I mentioned that briefly as to why we needed two laboratories, and I would like, if I could—when I am done, maybe Dr. Freedman could join in because he is the customer, and if he thinks we could do it with one, he would have said so, especially since he didn't have to pay for it.

Mr. MYERS. We have to pick the taxpayers' pocket to pay for it.

Dr. REIS. I have to convince you and him because the Department of Defense really asked that same question.

Mr. MYERS. We have California and New Mexico, and that is practically next door that your can collaborate with each other on a daily basis.

Dr. REIS. I mentioned a problem that showed up a few years ago on the W76; that is the TRIDENT warhead.

This is all classified. I know the whole hearing is classified, but this is really classified.

[Deleted].

What do you do in a situation like that? Ordinarily one would have gone back and tested. We were in a moratorium; we didn't test. We said, all right, let's figure out what has happened. [Deleted].

People ran the calculations. [Deleted.] That is a big deal. How do you handle that? Basically how do you handle that situation?

We had both laboratories. We gave them both the same job. All right, tell me what you think. Is that going to be an important factor or not? Needless to say the Defense Department was involved right from the start on this. [Deleted.]

LABORATORY INDEPENDENT RESEARCH

Each laboratory independently, by itself, went off and developed some special codes that were able to handle these very, very small features. Ordinarily, we don't have to deal with that. [Deleted.]

Each laboratory separately looked at that problem. They developed some separate and different codes. How do you validate those codes, okay? The laboratory at Los Alamos used the tools that they had available, the Pegasus pulse power machine. [Deleted.] They developed—Los Alamos did some special shock tube work. [Deleted.]

We went back and used those codes that—we discovered—by going to the archives, we discovered that there was a test [deleted] but in the results of that test there were some things that we didn't understand. By using these new codes, we were able to now go back and analyze; previous test data that we didn't quite understand why, we were able to now understand and be able to make that—compare those codes which predicted the events that we saw in that particular test.

We then were working with our friends and said, all right, both laboratories independently have come to this answer. [Deleted.] And he said no, that will be fine.

If we had only one laboratory going through that, there would always be that question. In the first place, if we would have had the one laboratory, it might have said there was no effect, or it might have said the effect was 50 percent.

So I think the specifics of having those two laboratories work independently against each other, where you don't have the ability to go back and test; or perhaps we would have had to go back and test, and we would not necessarily have gone back and tested—

Mr. MYERS. I guess I am hardheaded. You have come to the conclusion, along with the last two administrations, that we do not need underground testing and yet you are going to rely upon one NIF test for the reliability of our weapons, obviously, your analogy that you just made here.

Dr. REIS. No, sir, what I said was, right now, of course, we have used three different types of experimental situations. You use all of these tools, not just one tool. In fact, we feel that one tool won't do the job; that is why you need a number of tools.

LABORATORY OVERHEAD

Mr. MYERS. Why couldn't that have been done at one lab with one overhead instead of two overheads today? Think of the overheads of the lab. We are trying to decide about selling one of the agencies or not.

Dr. REIS. We did an analysis of that when this subject came up prior to the President's recommending that we go ahead and do two labs. Suppose if I am going to go ahead with the experimental facilities that we believe we need to do, if we are going to go ahead with the computation and the program to solve, how much money would I save by, in fact, moving from one lab to the other? And the answer was, you know, really minuscule.

Mr. MYERS. But who did the study?

Dr. REIS. We did. But we obviously would be glad to share that with anybody.

Mr. MYERS. I just think we have got to make some—we are going to leave. I guess we will not get the job done, but Mr. Fazio is going to stick around. He is hardly one to say we want to close Livermore.

Mr. FAZIO. Not on my watch.

Dr. REIS. Mr. Chairman, you know, I really do believe that it is absolutely fundamental that we have two laboratories, because I do believe that over the years those laboratories have—we were talking about culture before—those laboratories have been very skeptical about each other. And ultimately, that skepticism, that competitive feeling—we would work one against the other. If you don't have somebody questioning the ability to get the correct answer and don't ultimately have the ability, you will ultimately, have to go back and test, or you will have to essentially abandon the exercise.

Mr. MYERS. Well, I am not a scientist. I am just a country farmer and a country banker, and I have two little farms. I have tractors on one farm. We move them over when we have to. The bank, we have several branches. We only have one president and one bookkeeping office.

Something has to be done. We have terrible costs. I know you are not going to like it and lab directors are not going to like it. Things are very convenient and very comfortable, but something has to be done because we are running out of money. You have noticed that.

Dr. REIS. I have noticed that.

Mr. MYERS. And one way to get more bang for the buck is to eliminate some of our overhead.

Dr. REIS. Again, I think the analysis would indicate that the amount of overhead you would eliminate would be really small, because the overhead at one place as opposed to the overhead at the other place, you don't save all that much doing that for each of the weapons programs, because there are certain experiments that we feel need to be done. And the small difference—and it really is a very, very small difference that you get—is so much less important than this whole idea of dual validation.

Dr. Freedman earlier described that, before the President signed off on the Comprehensive Test Ban Treaty; he said, I really need both of those laboratory directors, I need the chairman of the Nuclear Weapons Council, I need everybody to be able to get up and look me right in the eye and tell me those weapons are all right.

And the expertise relies on both of those laboratories, and the expertise of those laboratories really is maintained by this skepticism that one laboratory has against the other.

The same thing, you have two sides of the aisle here. You need that clash——

Mr. MYERS. But we are not three States apart either. We have the same staff; we share the same staff.

Dr. REIS. That is our function here basically, the same staff. In this competition of ideas you fundamentally get the best result. And I am certainly convinced of that. I think the Chairman of the Joint Chiefs is convinced of that.

They raised those exact same questions. The Galvin report, as you know, raised those same questions. The Secretary of Energy has raised those same questions, and I think we have been able to convince them.

Obviously we have not convinced you yet, sir, that this is by far the most cost-effective way to get that job done.

Mr. MYERS. Dr. Freedman, as the buyer, what makes the difference to you, where that car was built?

Mr. FREEDMAN. I prefer to stick to nuclear weapons rather than cars.

This example that Dr. Reis has pointed out on the W76 is a very interesting one [deleted].

So we discovered a problem—and I represent a very skeptical group of military people sitting here; I mean, I will tell you that they believe in "show me"—and so I look at what happened on that and it is an interesting example because it is typical of what we can face in years to come.

We were very fortunate that we had this test data, as Dr. Reis pointed out, to confirm these two sets of analyses. But given that that was a warhead—[deleted] had we had to declare that warhead invalid, that we could no longer—that the Department of Energy could no longer certify that warhead, and we would have had to go into a sprint mode to rebuild that warhead. To produce a certifiable warhead, we would have had a cost that would have been exceedingly high to maintain this Nation's nuclear deterrence, sir.

Mr. MYERS. Mr. Fazio?

NATIONAL IGNITION FACILITY

Mr. FAZIO. Mr. Chairman, I knew, as a matter of fact, that this would be a good subject for both of us; and I was hoping to get into NIF a bit. I wanted to take a different approach.

Whether we are talking about obtaining a more Comprehensive Test Ban Treaty or preserving the Nonproliferation Treaty, it seems that we have to generate more support for our efforts to simulate nuclear testing at Livermore if we are going to get the political result we look forward to on our bill this year, and that is funding another increment of construction. And I am very concerned that the members who are oriented to this point of view are not getting a consistent read from their constituents and from the arms control community. It seems to be divided and it seems to be, at this point at least, somewhat counterproductive in terms of our getting those members who are oriented to the views of the Arms Control and Disarmament Agency or have support of public interest groups to back this.

I am wondering if you would comment, any one of the three of you—and I apologize for not having been here earlier, and I hope I haven't asked you for something that you have already provided—as to how you think their reasoning makes sense, if at all; and how we might go about the task of communicating with more of our colleagues here who are going to be making this very significant judgment.

Frankly, when it is proposed to cut or eliminate this project—and I am sure it will be on the Floor—it will come not only from people who argue about this reduction in Federal spending and the Department's budget, it will come from people who will be arguing that it is in the interest of people from the peace community. And that will be a double whammy, I am afraid. So I would be interested in your thoughts.

Dr. REIS. Let me start on that, but I will encourage my colleagues to join in on that, of course. I think that is an issue which I believe we faced last year and the year before.

Mr. FAZIO. It only gets more intense and the fight this year will be the toughest fight.

Dr. REIS. Of course, the stakes rise on this one. But we have, as you know, Mr. Fazio, at the request of Representative Dellums, who raised those very same issues, who represents, I think quite ably, the views that you described and was indeed, at the time he raised it, was the Chairman of the then-House Armed Services Committee. How can you explain at one time you are saying you are going to simulate many of the weapons physics that we are going to need in the event we are not testing? How is that going to deal with the concern for proliferation that other nations will say, well, you are still doing by other means the things that we are doing by testing? We want to be able to do the same things, but at the same time we are basically not testing.

We put in, at his request, and the Secretary said, look, we are not going to go ahead with the construction phase until we go through even Title I, the start of that, until we go through that process. That process would be done as one would do a NEPA process with scoping, with full input from the public, with an independent process where defense programs, we are going to talk about the nonproliferation aspects of that.

That was done by Ms. Rohlfing's group, and perhaps she can respond to the answer of that.

There is a second trap, as well, and that is that we have an arms control agency that is very concerned, obviously, about the—they were working on the Nonproliferation Treaty. That has been a major arms control initiative for this Administration, and it was passed successfully. We are right in the middle—really at the end point, if you will, of the negotiations on a Comprehensive Test Ban Treaty, and that has been looked at in detail by the Arms Control and Disarmament Agency. Mr. Holum, who is the director of that Agency, has looked at this again independently and has made very powerful statements, not even asked by me or the Department of Energy to get out in front, and he has gotten in front on that.

Ambassador Sweeney of this office is here in the hearings today to show his interest in just this—basically just this problem.

So I think if you asked me from a legislative strategy how to do that, one, it is important that we get that message across ourselves; but secondly, that we indicate that this is not self-serving on the part of those who are interested in the National Ignition Facility per se or the jobs or even the science or the weapons, but indeed that from an arms control perspective, it really makes more sense. We have experts who do this for a living, and I think they are the people who are respected by the arms control community within the defense programs. We have had independent experts who have absolutely no ax to grind look at that.

Mr. FAZIO. We need to get over the Hill here and communicate——

Dr. REIS. Mr. Myers, I would like to thank you, if this is our last meeting. It has always been interesting.

Mr. FAZIO. I hope you will keep working on him.

Mr. MYERS. We will work with you.

Mr. FAZIO. My point is that we need to get to the Hill, to the Members who are showing these tendencies and concerns, and we need to get to the community externally that influences them. That was my point. Because I think talking to the people on this committee is useful. And we don't have a consensus here, but we know this is going to be a Floor fight no matter what.

NIF NONPROLIFERATION STUDY

Ms. ROHLFING. I would be happy to respond. Let me speak just briefly to the nonproliferation study that we did of the National Ignition Facility.

We scrubbed very thoroughly the nonproliferation implications of the National Ignition Facility. This study was coordinated—just one note on the process—through other Federal governmental agencies that have an interest in this issue, most notably the Department of Defense and the Arms Control and Disarmament Agency, as well as other interested parties.

Before this document was finalized, it was published for stakeholder comments so the external audiences could comment on it. We also held a series of town meetings, if you will, to discuss this very issue, and it was also vetted by a panel of experts. The basic conclusions were that the NIF can contribute positively to U.S. arms control and nonproliferation goals and that the technical proliferation concerns are manageable, in particular, with respect to the vertical proliferation—and by "vertical," I mean an increase in the number of weapons or the type of nuclear weapons deployed by already-nuclear countries.

The conclusion was that NIF cannot proof-test any nuclear device and therefore cannot act as a replacement for full-up nuclear testing.

With respect to horizontal proliferation—and by that I mean the spread of a weapon capability to a state other than one of the nuclear states—the conclusion was that no ICF experiment or no NIF experiment is possible that will provide the data required to ensure that a boosted primary or thermonuclear secondary will indeed work as designed.

So, given those inherent limitations in this technology, we feel that, on the contrary, this is not going to be a proliferation concern. Rather, because it will enable U.S. weapons scientists to conduct meaningful laboratory scale experiments that will support a comprehensive test ban that, it indeed aids our nonproliferation goals. We will be happy to work further with the external community.

Mr. FAZIO. I am not dissenting from the views that you just expressed. I am just saying that there are a lot of people who should be in support of this because they are not convinced, because they are not getting that input and there is nobody better than those who have the knowledge and who would, I think, speak with some confidence about how you could provide stewardship for the stockpile.

And we need to hear that for other Members of Congress who are concerned that we are not testing and, therefore, we have a problem; but also that we can prevent further proliferation and we can do that with great certainty. You need to cover all the various points of view here, because it is heavy enough lifting when we are talking about spending any capital outlay.

So, with that, I appreciate your comments, and I have got to run to vote. And I thank you for appearing today. And would now adjourn the committee until tomorrow at 10:00.

[The prepared statements of Dr. Reis, Dr. Freedman, and Ms. Rohlfing and the questions and answers for the record follow:]

Statement of Dr. Victor Reis
Assistant Secretary for Defense Programs
Department of Energy
FY 1997 Appropriations Hearing

Defense Programs is requesting $3.7 billion in FY 1997 to carry out our stockpile stewardship and management responsibilities. The need for a safe and reliable nuclear weapons stockpile remains unchanged A credible nuclear deterrent remains the foundation of U.S. national security policy President Clinton has stated on a number of occasions "the United States must and will retain strategic nuclear forces sufficient to deter any future hostile foreign leadership with access to strategic nuclear forces from acting against our vital interests and to convince it that seeking a nuclear advantage would be futile. In this regard, I consider the maintenance of a safe and reliable nuclear stockpile to be a supreme national interest of the United States."

The United States' policy governing the nuclear weapons stockpile has undergone profound change to reflect the new and continually evolving geopolitical and military structures of the post Cold War world. In the past, our confidence in the stockpile was ensured through weapons research and development at the laboratories, supported by an extensive production complex and underground nuclear testing at the Nevada Test Site. In 1992, the United States announced a halt in the production and design of new nuclear weapons and a moratorium on underground nuclear testing.

In 1993, President Clinton continued the moratorium on testing and initiated the Science-Based Stockpile Stewardship program when he challenged the Department "to explore other means of maintaining our confidence in the safety, reliability, and performance of our weapons." The challenge was also supported by Congress through passage of the FY 1994 National Defense Authorization Act that directed the Secretary of Energy "to establish a stewardship program to ensure the preservation of the core intellectual and technical competencies of the United States in nuclear weapons." .

Last August, the President, emphasizing his continued support and confidence in science-based stockpile stewardship, announced that the United States would pursue a true zero yield Comprehensive Test Ban Treaty (CTBT) as a means of reducing the danger posed by nuclear weapons proliferation. The President also outlined a series of Safeguards, A through F, that define the terms under which the U.S. would enter the CTBT. Safeguard A specifically directs the conduct of a stockpile stewardship program to ensure the safety and reliability of the stockpile. In January, the Senate gave overwhelming approval to the START II Treaty and declared that the United States "is committed to proceeding with a robust stockpile stewardship program...."

The Stockpile Stewardship and Management Program, developed by Defense Programs in response to the above direction and policy guidance, is a highly integrated technical program for maintaining the safety and reliability of the U.S. nuclear stockpile There are three primary goals of this program:

- Provide high confidence in the safety, security and reliability of the U.S. stockpile to ensure the effectiveness of the U.S. nuclear deterrent while simultaneously supporting U.S. arms control and nonproliferation policies.
- Provide an appropriately sized, affordable, environmentally sound, and effective production complex to provide component and weapon replacements when needed, including limited lifetime components and tritium, and
- Provide the ability to resume U.S. nuclear testing and reconstitute nuclear weapon production capacities, consistent with Presidential Directives and the START II Treaty, should national security so demand in the future.

Traditionally, the activities of the three weapons laboratories and the Nevada Test Site have been regarded somewhat separately from those of the weapon production plants. However, all stockpile stewardship and management activities must achieve a new, closer linkage to each other

The Stewardship activities will play a major role in reducing the vulnerability of the smaller stockpile to single-point and common-mode failures, principally through research base support of the enhanced surveillance a new Stockpile Management initiative. The stewardship and management programs have shared responsibilities in advanced manufacturing and systems engineering studies to integrate technological drivers such as advanced computing into an efficient and effective production complex of the future. The Dual Revalidation program, managed by Stockpile Management, will encompass both laboratories and plants in a new joint process for validating the safety, reliability and performance of the stockpile over time. Finally, the Radiological/Nuclear Accident Response program, a Management function, continues to utilize capabilities throughout the weapons complex, including weapons expertise at the laboratories and specialized capabilities at the Nevada Test Site.

The Stockpile Stewardship and Management Program will transform the nuclear weapons complex from capacity-based to capability-based. The future complex will rely more on scientific understanding, computer simulations, computer aided design, and manufacturing agility rather than test empiricism and manufacturing capacity. Having a surge capability for reconstituting a larger stockpile in an emergency could permit the United States to further reduce its active stockpile if international conditions so warrant. Continued interactions with the commercial industrial base, through technology partnering, can leverage our limited resources with industry capabilities to assist us with advanced manufacturing methods, improved materials development, and high speed, integrated computing and communication systems.

STOCKPILE STEWARDSHIP AND MANAGEMENT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

The national security policy changes over the last several years have not eliminated the need for any of the current or historical core competencies and capabilities at the weapons laboratories, industrial plants, or the Nevada Test Site. These competencies and capabilities must be maintained for the foreseeable future Facilities in the current complex were sized to support a larger and more diverse weapons stockpile than will be required in the future and represent a capacity that exceeds our current need On February 28, 1996, the Department released the Draft Stockpile Stewardship and Management Programmatic Environmental Impact Statement (PEIS) which will form the basis for the Department's transition to the capability-based complex of the future. The PEIS covers the future capabilities required of the three weapons laboratories (Los Alamos, Sandia and Lawrence Livermore) the four industrial plants (Kansas City, Pantex, Savannah River, and Oak Ridge Y-12) and the Nevada Test Site.

The Department's preferred alternative for stockpile stewardship proposes construction and operation of the National Ignition Facility and the Contained Firing Facility addition to the Flash X-Ray Facility at the Lawrence Livermore National Laboratory and the Atlas Facility at the Los Alamos National Laboratory. All three facilities examine different aspects of weapons physics, key to understanding weapon safety and reliability. It should be noted that the Dual Axis Radiographic Hydrodynamic Test (DARHT), planned for Los Alamos National Laboratory, is another key facility in support of the stockpile stewardship program, but is considered as part of the no action alternative because an Environmental Impact Statement has been prepared for that facility and an independently justified Record of Decision has been made.

The Department's preferred alternative for stockpile management proposes to downsize in-place the following activities: weapons assembly/disassembly at Pantex; nonuclear component fabrication at the Kansas City plant; and secondary and case component fabrication at Oak Ridge (Y-12). Pit component fabrication is to be reestablished with a small production capacity at Los Alamos. At this time, no preference has been established for high explosive component fabrication, but we will continue to examine this issue. For major stockpile management functions, downsizing at the current locations has a number of advantages. First, it minimizes the socioeconomic impact on the worker and communities surrounding the facilities. Second, it is the most cost effective solution Finally, it lowers the technical risk and provides the needed flexibility to support potential variances in stockpile size under START I or START II.

While downsizing in place and the resulting decontamination and decommissioning activities will minimize the number of displaced workers, some job losses are inevitable. To assist the workers and host communities, the Department will prepare workforce restructuring plans, as required by law and in consultation with our stakeholders, to mitigate job losses. The Department will conduct public hearings in Washington, D.C., and at each of the affected sites in March and April 1996. The comment period runs from March 8, 1996, to May 8, 1996. A final Environmental Impact Statement is scheduled for July followed by a Record of Decision in August 1996.

STOCKPILE MANAGEMENT ACTIVITIES

The Stockpile Management program continues its historical responsibilities to provide near term and long range support for the stockpile, and for ensuring an adequate supply of tritium It also includes new programs and procedures to deal with the aging stockpile, a result of no requirement to build new weapons. Along with stockpile surveillance, the historical responsibilities include normal maintenance, corrective maintenance and system refurbishment, as well as weapon dismantlement The DOE has completed a separate Programmatic Environmental Impact Statement for tritium production, and is pursuing a dual-track approach to select a production method by 1998.

The current stockpile is safe, secure, and reliable. However, the history of the stockpile has shown that continuous surveillance, repair, and replacement of components and subsystems are commonplace. In fact, the nine weapons that will be in the START II stockpile have already been retrofitted to varying degrees and some have had major components of the nuclear system replaced. We cannot predict with any certainty when such problems will arise in the future, but we expect that as the stockpile ages beyond its intended lifetime, these types of problems may become more commonplace.

An enhanced surveillance program has been initiated to better predict weapon components failure, due to aging, in order to allow refurbishment of the stockpile. We are looking at new methods for manufacture that will provide more efficient realization of products with waste-stream minimization. Our maintenance program not only deals with ongoing weapon upgrades and modifications, but also with the routine need to exchange limited-life components like tritium reservoirs and neutron generators. Several new programs have started focusing on weapon evaluation, such as dual revalidation of the W76 warhead in the Trident and the new requirement of the President for annual certification of the stockpile. Finally, our emergency response program is ready in the event of a nuclear incident or accident. This program conducts several exercises annually, at various levels, to maintain its response capability

SURVEILLANCE

Ongoing surveillance is vital to the continuing viability of the stockpile. These activities support the entire weapons stockpile in the quantities authorized by the Nuclear Weapons Stockpile Plan. Surveillance is conducted by inspecting a statistically significant number of each weapon type drawn from the stockpile annually, tearing them down, testing the components, and, in most cases, rebuilding them and placing them back into the stockpile. A few of these weapons are tested to destruction. A selected number of flight tests with simulated nuclear components are also performed annually. This process requires that the tested weapons that are rebuilt are reassembled from components that were originally manufactured or stockpiled when the weapon was being produced. In some cases, we expect to run out of new components and will have to substitute replacement components or otherwise determine how to rebuild them.

The surveillance program historically has been successful in discovering weapons defects. We expect that it will continue to find between one and two defect types per year, which will require some degree of augmented maintenance. We are currently testing pits (Los Alamos), secondaries (Y-12), neutron generators (Sandia), detonators (nuclear design laboratories), gas reservoirs (Savannah River), and nonnuclear components (Kansas City), in addition to the main line disassembly activity ongoing at Pantex.

MAINTAINING THE STOCKPILE

Maintaining the stockpile has become a program which will provide for indefinite life extension. Before the end of the Cold War, the average life of all weapons in the stockpile never exceeded 13 years, also the current average, and weapons rarely remained in the stockpile beyond 30 years. With no new weapons planned, weapons will soon begin to approach an age beyond our experience base. DOE must continue to supply hardware for Limited Life Component Exchanges (LLCEs), provide hardware to support ongoing and approved future refurbishment through the Stockpile Life Extension Program (SLEP), and provide hardware to prevent attrition of the stockpile by the surveillance program. In addition, we must continue to meet the stockpile requirements for Field Service, logistics support functions, and dismantlement and storage.

With weapons being retained in the stockpile for an indefinite period, individual weapon parts could eventually reach the limit of their reliable lifetime and may require refurbishment or replacement. Thus, design, production, and refurbishment capabilities must be structured to respond to the requirements of the SLEP. Near-term scheduled deliverables supporting the stockpile include: LLCE (tritium reservoir and replacement activities), stockpile refurbishment (B61 Alterations, B83 quality improvement program, W76 neutron generators, W87 life extension program), surveillance rebuilds (W88 pit), and the capability to design and develop changes to existing warheads and components (warhead protection program, common radar for B61/B83 and new tritium reservoir for W76).

DUAL REVALIDATION

Dual Revalidation is a new, robust form of peer review designed to assure both DOE and DoD that the stockpile remains safe, secure and reliable. The Dual Revalidation Program was approved by the Nuclear Weapons Council (NWC) in January 1996. In the absence of underground nuclear testing and with no new warhead development, this new process will validate, with high confidence, that the stockpile will continue to meet its specifications for Military Characteristics (MCs) and Stockpile-to-Target Sequence (STS).

Under Dual Revalidation, two teams will perform independent evaluations, the first team drawn from the original design laboratory and the second team from the alternate laboratory. Dual Revalidation will provide a baseline assessment of the condition of the warhead today and a process to identify future problems. The evaluation will be managed by the joint DoD/DOE Project Officers Group and is expected to take 2-3 years for each warhead type. The W76 will be the first warhead revalidated. The increased DoD involvement in and technical understanding of the assessment should provide them with the confidence in the stockpile previously supplied by nuclear testing.

NEW ANNUAL CERTIFICATION PROCEDURE

A primary DOE responsibility is to certify the safety and reliability of the nation's nuclear stockpile. As a result of the President's August 11, 1995, announcement, there is a new annual reporting and certification requirement, requiring the Secretaries of DoD and DOE, as advised by NWC, the Commander of the U.S. Strategic Command, and the Directors of DOE's Nuclear Weapons Laboratories, to provide an annual certification that the stockpile is safe and reliable in the absence of nuclear testing. A broad-based review of ongoing efforts and existing documentation will be conducted each year; it is not intended as justification for any new program(s). All active and inactive weapon types will be considered by the weapons laboratory responsible for the original design and the DoD-led joint Project Officers Group. This effort is intended to assure the President that nuclear weapons are safe and reliable as we continue on the path to a true zero yield CTBT. We expect to submit the first annual report to the Secretaries of Energy and Defense in August 1996.

ENHANCED SURVEILLANCE PROGRAM

Enhanced surveillance is an essential development program for stockpile management. The program was finalized in the first quarter of FY 1996 and the development effort was initiated in the second quarter. It is the critical element of the SLEP and uses advanced science to predict component and material lifetimes. The enhanced surveillance program is a complex-wide integrated program involving the four production plants and the three weapons laboratories and is central to restructuring our stockpile maintenance and refurbishment procedures in an era without underground nuclear testing and no new production.

To accomplish this effort, enhanced surveillance will focus on three major areas: 1) materials science, 2) development of materials aging models, and 3) testing and monitoring technologies. This program will develop models which will account for aging effects in weapons materials, components, and systems that will help us to predict service lifetimes and to schedule ,with the DoD, necessary component replacement. Because the stockpile of the future will be smaller and less diverse, we must proactively identify and repair components before they fail (due to aging effects) to ensure the maintenance of a credible stockpile. This will have the effect of making all weapons components subject to time-phased replacement with lifetimes varying widely, for example, metal versus plastics. The advanced diagnostic and testing techniques developed in this program will collect information that not only supports our model development, but advances our knowledge of the behavior of these complicated materials and components over time. It is anticipated that diagnostic instruments may be required that can be placed in a weapons system to monitor critical components in real time.

The surveillance techniques, procedures, and models developed in this program will be incorporated into the ongoing core surveillance program when we are confident of their validity.

With these new tools, our program of stockpile maintenance will be in a genuinely predictive mode.

ADVANCED MANUFACTURING CAPABILITIES

Advanced Design and Production Technologies (ADaPT) is an initiative to coordinate and focus the activities of the laboratories and weapons plants in the creation of a reconfigured and rightsized production capability. It will be a necessary element to tie surveillance activities to future manufacturing capabilities. ADaPT will exploit emerging information and manufacturing technologies to better integrate the nuclear weapons complex and will develop modular, scalable, environmentally sound manufacturing processes needed for maintenance of a reliable stockpile under a wide range of demands. Current ADaPT work is concentrated on planning and evaluation of current advanced manufacturing activities in the plants and laboratories.

TRANSPORTATION OF SPECIAL NUCLEAR MATERIALS

The transportation of special nuclear materials has become an increasingly important element of stockpile management as a result of both dismantlement and the restructuring and consolidation of military bases in the United States. The Department provides for the transportation of special nuclear materials, nuclear weapons, and weapons components throughout the continental United States via specially designed safe, secure tractors and trailers (SST's).

The Department has accumulated more than 83 million miles of over-the-road experience with no accidents causing a fatality or release of radioactive materials, and without damage or compromise of the cargo. Much of this can be attributed to the well managed, highly trained, competent, and dedicated work force of more than 260 couriers with nationwide secure communications. In addition, largely due to our specialized in-house training capability, the nuclear material couriers are one of the most highly effective protective forces in the world. Seventeen new trailers called Safe Guard Transporters (SGT), incorporating the latest advances in materials and transportation technology, are currently being built to keep the overall system best in class

DISMANTLEMENT

Since the end of World War II, the Department and its predecessors have disassembled some 55,000 nuclear warheads in a safe, secure, and an efficient manner. During the last fiscal year, 1,393 weapons were safely dismantled at the Pantex Plant. Since the beginning of the current fiscal year we have dismantled 545 warheads, and expect to complete the FY 1996 total goal of 1,164. We are on schedule to complete the W48, B61 mod 0, and W70 dismantlement lines and start up the B61 mod 2 and W69 dismantlement lines.

In FY 1997, we expect to dismantle about 1,300 nuclear weapons and will complete the W55 and B61 mod 2 dismantlement lines and start the W56, B61 mod 5, and W79 lines. The planned dismantlements should eliminate the backlog of retired weapons by FY 1999 and supports DoD activities. The Pantex workload is expected to remain stable for the next several years as we reduce the nuclear stockpile consistent with our arms control commitments.

EMERGENCY RESPONSE

The Emergency Response program is the U.S. Government's singular national capability to provide the critical technical expertise necessary to resolve any major radiological emergency or nuclear accident within the United States and abroad. Its intimate association with the nuclear weapon complex allows us to capitalize on weapon program core activities in both the areas of stockpile stewardship and management. The all-volunteer force that make up the cadre of deployment forces are mostly from the core weapons program.

Not withstanding the Department's pursuit of both the dismantlement program and our commitment to ensuring a safe, secure, and reliable stockpile, we must have the necessary plans in place to provide a rapid response in the event of a nuclear weapon accident. While the occurrence is extremely unlikely, we are prepared to effectively mitigate the consequences of an accident. We are in the initial planning stages for a full field training exercise, where DOE will be in charge of command and control as well as provide the technical expertise necessary to resolve the accident. This exercise is scheduled for mid-1997.

Further, as result of the breakup of the Soviet Union and our aggressive stance to curb the development of weapons of mass destruction, the Department plays a vitally important support role in combating acts of nuclear terrorism, through its Nuclear Emergency Search Team (NEST). NEST provides the operational and technical expertise to the Federal Bureau of Investigation in the United States, and supports the State Department in a similar manner overseas. We have vigorously pursued bringing the program up to present day standards necessary, based on the available intelligence, to counter the current nuclear threat and trends in these activities. Our present and near-term activities include continuance of a rigorous training program and pursuing improved search, device assessment and disablement capabilities.

TRITIUM SUPPLY

An integral part of ensuring confidence in the stockpile is providing an adequate supply of tritium, a radioactive gas required for all U.S. nuclear weapons to operate as designed. Tritium, with a half life of 12.3 years, decays at a rate of 5.5 percent per annum. To meet current stockpile requirements, the Department is recycling tritium from dismantled weapons. A new tritium production source will be needed by the year 2005 to maintain the START I stockpile, and the associated 5-year tritium reserve, until full ratification and entry into force of the START II Agreement. The current supply of tritium is sufficient to meet the START II stockpile, and the associated 5 year tritium reserve, until 2011, as given in last year's testimony.

Last year, the Department completed work on the Tritium Supply and Recycling Programmatic Environmental Impact Statement. On December 6, 1995, the Secretary issued the Record of Decision in which the Department outlined a dual track strategy for assuring a safe, reliable source of tritium to meet national security requirements. One track will investigate the purchase of a commercial reactor or irradiation services. The other track will develop and test accelerator production of tritium. The Department has requested $100 million in the FY 1997 budget to pursue both alternatives. By 1998, one of these alternatives will be selected to become the primary tritium production method. The other, if determined to be feasible and practical, could become an assured backup capability.

There are no difficult technical issues associated with the production of tritium in a light water reactor but there are regulatory and licensing uncertainties. Tritium producing targets for use in light water reactors were developed and tested several years ago but work on the target development program was suspended by Congress in 1992. During the past several months, the Department has revived this effort. While additional target qualification studies are needed to support regulatory and owner approval for their use in commercial reactors, the work already accomplished has demonstrated that the target will work extremely well in light water reactors.

Recently, the Department invited expressions of interest from electric utility companies owning commercial nuclear facilities to determine their preliminary level of interest in either selling a reactor or irradiation services to the Department for tritium production. The response to that invitation has been very encouraging, and we will soon be developing a formal solicitation of proposals for the sale of facilities or services to the Department to make tritium. In addition, within the next few weeks, the Department and the Nuclear Regulatory Commission (NRC) will conclude the development of a Memorandum of Understanding governing the interaction between the two agencies for target qualification and NRC reactor licensing activities.

Technical activities in FY 1997 for the commercial reactor approach will include target testing to support qualification, target fabrication demonstrations to support target procurement, and extraction process development to support construction and upgrade of the Savannah River tritium facilities. Initial confirmatory target testing in commercial reactors is planned for late FY 1997 as is the conditional selection of a reactor or reactors which the Department would use to meet tritium requirements.

The accelerator alternative has comparatively minor nonproliferation and regulatory concerns and requires no technological breakthroughs. However, several features and portions of the technology need to be demonstrated at production power levels. The design choices (e.g. proton energy, power requirements, size of the plant, and accelerator components) will only affect the cost, reliability, and maintainability of the system. The project includes a development effort to select between technical alternatives, testing to establish performance and reliability, and the use of industry for conceptual and engineering design and, if built, construction. These efforts will narrow the cost uncertainty range. The Savannah River Site will be the location of the accelerator if a decision is made to proceed with construction.

Accelerator production of tritium activities in FY 1997 will focus on developmental engineering and component qualification to establish baseline design of the accelerator components. Most of these activities will be done by or under the technical direction of Los Alamos National

Laboratory. During this year, the prime contractor for the APT production facility will complete a Conceptual Design Report (CDR), which will establish baseline design and greatly narrow the cost uncertainty. This report would also provide a basis for requesting approval to begin engineering design in FY 1998.

STOCKPILE STEWARDSHIP

In the past, nuclear testing filled the gaps in the basic understanding of complex physics phenomena and provided high confidence in the certification of nuclear safety and performance. Existing tools which were used in conjunction with nuclear testing are inadequate if used alone. Assessment of stockpile problems and certification of repairs or replacements of nuclear components in the future will have to rely on improvements to these tools. Science-based stockpile stewardship will focus on obtaining more accurate and complete scientific understanding and experimental data, developing advanced computer simulations, and validating new tools using past nuclear data and new experimental data.

The key to the success of the Stockpile Stewardship and Management Program are the three weapons laboratories and their core intellectual and technical competencies. On September 25, 1995, President Clinton concluded that the "vitality of all three DOE nuclear weapons laboratories [is] essential and directed DOE to maintain nuclear weapons responsibilities and capabilities adequate to support science-based stockpile stewardship." The competencies of the weapons laboratories embody more than 50 years of knowledge and experience that cannot be found anywhere else in the United States. The science and engineering technology base at the laboratories is responsible for meeting all technical requirements for U.S. nuclear weapons. The personnel at these laboratories currently perform the basic research, design, system engineering, development testing, reliability assessment, and certification of nuclear performance using existing experimental facilities and computational capabilities. In addition, they determine and control all technical specifications that are used by the industrial base for manufacturing and surveillance operations and for maintenance operations conducted by DoD. Data from these operations is provided to the weapon laboratories for assessment and technical resolution of performance and safety problems.

Because there is no absolute guarantee that the initiatives discussed below will provide the capabilities to ensure the safety and security of the stockpile without underground nuclear testing, the United States will maintain the capability to conduct nuclear testing at the Nevada Test Site (NTS). The Department will also maintain the necessary technical capabilities at the weapons laboratories to design and conduct such tests

ADVANCED EXPERIMENTAL CAPABILITIES

The National Ignition Facility (NIF) is being designed to produce, for the first time in a laboratory setting, conditions of temperature and density of matter close to those that occur in the detonation of nuclear weapons. The NIF's 192 beam laser with 50 times more energy than any existing laser is intended to be capable of compressing a tiny capsule of hydrogen isotopes to pressures 100 billion times earth's atmosphere and at temperatures hotter than the center of the sun. Nuclear fusion, that occurs in stars and weapons, is predicted to occur in the tiny NIF target. The ability to study the behavior of matter and the transfer of energy and radiation under these conditions is key to understanding the basic physics of nuclear weapons and predicting their performance without underground nuclear testing. Experiments at the NIF could test the validity of computer-based predictions and demonstrate how aged or changed materials in weapons could behave under these unique conditions. The challenges and research opportunities at the NIF would attract world-class scientists and engineers, thus help ensure that the Nation's national security challenges could be addressed by laboratory experts second to none.

Recently, the inertial confinement fusion program and its technical basis for the NIF were favorably reviewed by the Inertial Confinement Fusion Advisory Committee, and the relationship between stockpile stewardship and the NIF was specifically and positively endorsed by the JASONs. During the past year, the Office of Arms Control and Nonproliferation of DOE completed public hearings and a thorough study on the "Issue of the NIF and Nonproliferation". In December 1995 Secretary O'Leary determined that the construction of the NIF supports the nuclear nonproliferation objectives of the United States.

Construction of the NIF is part of the stockpile stewardship preferred alternative in the recently released Draft PEIS for Stockpile Stewardship and Management. The environmental analysis concerning NIF in the final PEIS will be sufficient for approving its construction and operation. The final decision on location of the NIF will not occur until the Record of Decision later this summer.

Title I design activity is now underway and will provide cost estimates on the project baseline in the fall of 1996. The FY 1997 budget request of $191 million will provide funds to prepare an industrial component fabrication capability and to complete Title II, site-specific, detailed construction design. This work will provide the basis for a construction decision by the Administration in mid-1997.

Current hydrodynamic testing facilities, the Pulsed High Explosive Radiographic Machine Emitting X-rays (PHERMEX) at the Los Alamos National Laboratory (LANL) and the Flash X-Ray facility (FXR) at Lawrence Livermore National Laboratory (LLNL), were adequate to meet the challenges of stockpile stewardship in conjunction with nuclear testing. In the absence of nuclear testing, however, more capable hydrodynamic testing facilities will be required. The Dual Axis Radiographic Hydrodynamic Test facility (DARHT) planned for construction at LANL is the first such facility. Through its dual-axis, multi-time viewing capability, it will provide crucial experimental data on many of the systems in the stockpile and hence will directly support performance and safety revalidation, enhanced surveillance, and an improved predictive capability. Furthermore as the most capable hydrodynamic testing facility in the complex, DARHT will play a central role in developing advanced technologies for a next-generation Advanced Hydro test Facility.

Construction of DARHT was enjoined by a Federal Court order in January 1995, pending completion and judicial review of an Environmental Impact Statement (EIS) and associated Record of Decision (ROD). The EIS was completed in August 1995 and the ROD issued in October 1995. A motion to dissolve the injunction was filed subsequently by the Department of Justice, but the issue remains before the court at this time. The ROD states the Department's intention to finish the facility using new and improved technology as appropriate, and also directs implementation of a phased containment process to reduce by 75% the environmental emissions from radiographic hydro testing. The Department, in conjunction with the Department of Justice, has supported this project through the thorough and accelerated completion of the EIS, release of an unclassified environmental impact summary developed from certain classified matter, and an expedited response to the Federal Court's clearance request for three of its staff.

The Atlas facility to be located at Los Alamos National Laboratory is also included in the list of new experimental capabilities. The facility provides a pulse power experimental capability to address secondary weapons physics in an energy rich, high energy density environment. The FY 1997 budget includes $15M to allow construction to begin in mid FY 1997.

The Los Alamos Neutron Science Center (LANSCE), while not a new facility, is the most powerful neutron research facility in the world, providing an intense source of pulsed neutrons for experiments supporting national security and civilian research. Neutrons are unique and valuable probes of matter on scales ranging from the subatomic to complex materials. At low energies, neutrons are used to study many critical weapons materials issues. At higher energies, neutrons probe the small-scale structure of atomic nuclei, which is important for studies of nuclear weapons processes. At the very highest energies, neutrons can penetrate very thick materials providing unique surveillance capabilities.

LANSCE now has in place a substantial program focused on its key mission in stockpile stewardship. The program is divided into five projects : Advanced Radiography, Weapons Materials, Weapons Nuclear Physics, High-Explosives Characterization, and Weapons Design Physics.

ADVANCED COMPUTER CAPABILITIES

The Accelerated Strategic Computing Initiative (ASCI) is a major part of Defense Program's response to Presidential decisions to halt nuclear weapons tests and pursue a zero-yield Comprehensive Test Ban Treaty. ASCI is designed as a balanced program to accelerate the development of nuclear weapons simulation codes, scientific understanding of weapon behavior, advanced computer platforms, and computing environments and infrastructure. These advances are essential for addressing the challenges of creating the only credible integrated test bed alternative to nuclear testing by using simulations for investigating performance, safety, and reliability of weapons in the nuclear stockpile.

ASCI will build on the core stockpile computing program at the weapons laboratories to develop the applications, computers, and simulation capability for integrated device assessments, and a predictive aging capability to enable a focus on extending the lifetime of the current stockpile. ASCI will work closely with the U.S. computer industry to accelerate companies' technology plans to provide computer systems that far exceed current industry predictions, but ones which are absolutely essential for stockpile stewardship success. ASCI will also engage U.S. universities to work on problems that are critical to physics, materials modeling, and computer science issues that are needed to support the ASCI simulation capabilities.

The simulation of nuclear weapons requires a weapon applications capability improvement of 10,000 to 100,000 times more than the current design capability. ASCI will create multiple industrial research partnerships to accelerate current performance trends in supercomputers. It is not possible to predict which technology path will lead to the best results; indeed, it is unlikely that a single technical approach will serve all application needs. Therefore, the research partnerships must overlap both in time and in technical approach in order to achieve a high payoff with manageable risk, ensure flexibility, and provide a diversity of technical approaches. To accelerate development of computer hardware, software, and communications, an aggressive, integrated, and sustained approach is required which accelerates important computer technology including: advancing the availability of very high performance computers--systems capable of 100's of Teraops (trillions of scientific operations per second), high speed interconnect and encrypted links, and distributed high performance computing (HPC) environments.

ASCI is well underway. In FY 1996, ASCI funded 11 new code or constituent model start-up efforts. Four of these code starts focus directly on increasing the ability of laboratories to predict the integrated performance and safety of weapons through computational means. On August 22, 1995, the Secretary announced the Defense Programs procurement of the world's fastest computer to be delivered to Sandia National Laboratory in December 1996. This computer will run at more than one trillion operations per second and will be dedicated to solving difficult weapons problems. On February 20, 1996, the Department, through Los Alamos and Lawrence Livermore National Laboratories, announced a competition for a follow-on system that will explore a different architecture and will run at three trillion operations per second. In order to support collaboration among ASCI researchers at the three laboratories, the first secure high-speed data network linking the Los Alamos, Sandia and Lawrence Livermore National Laboratories was established on October 20, 1995.

The ASCI program will continue to advance during FY 1997. Significant efforts will be required to continue the development of the codes started in FY 1996. The development plans for these codes include the delivery of initial capabilities needed to certify planned near-term stockpile modifications (e.g. W76 re-certification, W88 pit rebuild, and B61 Mod 11.) The development of these codes also requires a significant interface with Defense Programs experimental facilities for verification and validation. FY 1997 will also see the delivery of the one trillion operations per second computer at Sandia and two development systems for the three trillion operations per second computer at Los Alamos and Lawrence Livermore. Significant modeling, software, and infrastructure work will be required to enable weapons code development and simulation on those computers. The FY 1997 budget requests $122 million for ASCI.

The ASCI can and should proceed rapidly. It will provide continual improvement to our assessment and certification tools in the core stockpile computing and modeling program. For example, recently developed 3-D computer models that can now begin to interpret the complex fluid instabilities near special weapon features, provided essential data on design changes to the W-87 warhead. This data was a significant factor in allowing us to proceed without testing.

TEST READINESS

President Clinton has directed the Department to maintain a basic capability to resume nuclear testing activities at the Nevada Test Site (Safeguard C) should the United States deem it necessary. One of the ways the Department will retain this capability is to conduct, over the next several years, a series of subcritical experiments with nuclear materials at the Nevada Test Site. Two subcritical experiments are planned for FY 1996 and four for FY 1997.

Subcritical experiments use high explosives to create some of the physical conditions, such as pressure and temperature, under which nuclear materials function in a nuclear weapon. These experiments will provide an improved understanding of certain dynamic material properties of plutonium essential for assessing nuclear warhead performance, reliability, and safety. Subcritical experiments will help the U.S. monitor the aging nuclear weapons stockpile, and assist in developing our computational and modeling capabilities by providing essential experimental data on the performance of aging warhead components.

Above ground experimental programs, conducted at the weapons laboratories as a part of the Stockpile Stewardship and Management Program, also contribute to readiness in a variety of ways. This includes experiment planning and pretest preparations, the conduct of the experiments, and reduction and interpretation of post-shot data. Of special importance to test readiness is the area of diagnostics and data acquisition, including the continued development of sensors, recording instrumentation, and data interpretation techniques

The Nevada Test Site is planning training exercises to practice the skills and functions necessary for nuclear testing which are not involved in either the subcritical experiments or the high explosives experiments which take place at the site. To further preserve a nuclear testing capability at the test site, the processes necessary for conducting nuclear tests are being carefully archived. A core roster of experienced retirees, which could be called up if testing were to be resumed, is also being compiled. The FY 1997 budget has requested $164 million to support Nevada Test Site readiness.

FISCAL YEAR 1997 BUDGET SUMMARY

The following table breaks out the FY 1997 budget requirements for Defense Programs in the Weapons Activities appropriations account. The request of $3.7 billion, reflecting our total obligational authority requirements, is allocated among three major program areas: Stockpile Management ($1.8 billion); Stockpile Stewardship ($1.6 billion); and Program Direction ($0.3 billion). This latter account provides the Federal salaries and related administrative expenses to manage the Stockpile Stewardship and Management Program.

DEFENSE PROGRAMS
FY 1997 CONGRESSIONAL BUDGET
($'s IN MILLIONS)

	Adjusted FY 1995	Adjusted FY 1996	Proposed FY 1997
Stockpile Management			
Base Stockpile Management	1,438	1,599	1,496
Tritium Supply	0	75	100
Enhanced Surveillance Program	0	18	40
Radiological/Nucl. Accident Response	69	71	80
Special Nuclear Materials - Surveillance	80	81	83
Subtotal: Stockpile Management	1,587	1,844	1,799
Stockpile Stewardship			
Base Stockpile Stewardship	968	1,008	1,041
Nevada Test Site Readiness	200	183	164
National Ignition Facility	6	61	191
Accel. Strategic Computing Initiative	0	85	122
Education	20	10	10
Technology Transfer	214	149	49
Subtotal: Stockpile Stewardship	1,408	1,496	1,577
Weapons Program Direction	365	327	334
TOTAL DIRECTED PROGRAM	3,360	3,667	3,710
Use of Prior Year Balances	-148	-211	0
NEW OBLIGATIONAL AUTHORITY	3,212	3,456	3,710

CONCLUSION

The purpose of the Stockpile Stewardship and Management Program is to ensure the safety and reliability of the nuclear weapons stockpile, without underground testing. Our strategy is based upon a stockpile life extension program that treats each component of each weapons as a limited life component; a dual track approach to ensure a supply of tritium; assessment and certification procedures based upon previous tests; a more detailed scientific understanding of weapon processes and advanced computation; and a downsized, but modernized and flexible production complex. We believe this strategy best fits the nuclear requirements for the post Cold War era, balancing support for the current stockpile with the research needs for extending stockpile life and maintaining the vitality of the research, production, and testing team.

Statement of

The Deputy Assistant to the Secretary of Defense (Nuclear Matters)

Dr. Jerry M. Freedman

before the

House Energy and Water Development Appropriations Subcommittee

March 28, 1996

Mr. Chairman and members of the Subcommittee, I am honored to have this opportunity to appear before you. I will begin by stating that, today, the stockpile is safe, secure, and reliable. My remarks will focus on the shared responsibility between the Department of Defense (DoD) and the Department of Energy (DOE) to assure high confidence in the Nation's nuclear stockpile. This responsibility presents a new challenge because the nuclear weapons in our stockpile will be retained well beyond their intended design lifetimes without the benefit of underground nuclear testing.

The President recognized this challenge for the nuclear weapons program in his August 11, 1995 speech announcing the US position on a zero yield Comprehensive Test Ban Treaty (CTBT): "In order for this program to succeed, both the administration and the Congress must provide sustained bipartisan support for the stockpile stewardship program over the next decade and beyond. I am committed to working with the Congress to ensure this support." The President further directed a new annual certification to assure the safety and reliability of the nuclear stockpile. Finally, he stated that he would be prepared to "exercise our supreme national interest rights under the CTBT in order to conduct whatever testing might be required" if a high level of confidence in the safety or reliability of a nuclear weapon type critical to our deterrent could no longer be certified. With this challenge and commitment in mind, I will review some of the changes in the nuclear weapons program and actions that are being taken to ensure that we -- and our potential enemies -- continue to have high confidence in the stockpile.

The end of the cold war has wrought significant changes in the nuclear weapons program. Over the last decade, there has been an unprecedented shift in emphasis from design, development, fabrication, and testing of new warheads to refurbishment and life extension of existing warheads. Our stockpile has been reduced in size and diversity of weapon types and, by the end of this fiscal year, the current inventory will become the oldest in US history. Today, we do not have the capability to manufacture replacements for the nuclear warheads that comprise our existing stockpile. We must comply with environmental requirements that are increasingly challenging and litigious. The extended underground test moratorium has evolved into a US position for a zero yield CTBT. Finally, without the traditional yardstick of underground testing, it will become ever more difficult to replace the shrinking cadre of nuclear weapons experts. These changes have forced a shift in strategy at the Departments of Defense and Energy and were addressed in the DoD's Nuclear Posture Review.

The Nuclear Posture Review

Approved by the President in September 1994, the Nuclear Posture Review (NPR) continues to provide the DoD policy guidance, force structure, and stewardship obligations for the enduring nuclear weapons stockpile. The NPR codified the national policy of "lead and hedge" as our approach to nuclear weapons and the attendant technology infrastructures. The policy of "lead and hedge" simply means that the US will "lead" strategic arms control efforts toward START II or smaller force levels, but retain the ability to "hedge" by returning to START I levels. It is our policy, as part of this strategy, that until START II ratification and entry-into-force, we will draw down and maintain our strategic forces at warhead levels consistent with START I.

Although primarily a DoD document, the NPR contains infrastructure requirements for the Department of Energy to ensure high confidence in the enduring stockpile, namely:

--- Maintain nuclear weapon capability without underground testing or the production of fissile material:

-- Develop a stockpile surveillance engineering base;

-- Demonstrate the capability to refabricate and certify weapon types in the enduring stockpile;

-- Maintain the capability to design, fabricate, and certify new warheads;

-- Maintain a science and technology base;

--- Ensure tritium availability, and;

--- Accomplish these tasks with no new-design nuclear warhead production.

To meet these requirements, we must provide an environment for the development of nuclear experts who can meet tomorrow's ever increasing challenges. The DOE, with assistance from the DoD, is pursuing a Stockpile Stewardship and Management Program to meet NPR requirements.

The Stockpile Stewardship and Management Program (SSMP)

As DOE continues to address NPR infrastructure requirements, the SSMP will provide a structured approach to deal with the lack of underground testing and no new nuclear weapon production. In the past, underground nuclear testing was the ultimate arbiter of the stockpile. Absent this arbiter, the DOE must develop new approaches to ensure high confidence in our nuclear deterrent. The SSMP must include: 1) enhanced surveillance of the stockpile, 2) expanded computational capability such as the Accelerated Strategic Computing Initiative (ASCI), 3) above ground experimental facilities (AGEX), 4) subcritical plutonium experiments at the Nevada Test Site and the ability to return to underground testing , 5) a limited capacity to remanufacture warheads in the existing stockpile, and 6) an assured source for tritium.

The DoD is satisfied with the progress that is being made by the DOE to fulfill its responsibilities as delineated in the NPR, but much remains to be done. For example, The Nuclear Weapons Council (NWC) endorses the DOE's dual track approach of pursuing a commercial light water reactor and accelerator produced tritium (APT) sources, by 2005 and 2007 respectively, but both approaches must overcome technical and institutional challenges. In the case of warhead fabrication, we must first establish a baseline capacity to replace those warheads routinely consumed by the quality assurance and reliability test program (QART) and be capable of expanding this capacity to handle precipitous failures of a type of warhead. We must be ever more vigilant in the stockpile surveillance program and demonstrate that systemic failures can be anticipated with sufficient time to implement corrective actions. The two Departments must continue to certify high confidence in the stockpile without the benefit of underground nuclear testing.

Maintaining High Confidence in An Aging Stockpile

In its effort to improve its corporate expertise in aging nuclear weapons, the DoD is becoming a more active partner with the DOE as warheads and components are assessed and certified. At the individual level, the DoD will increase the number of personnel assigned to the DOE weapon laboratories. The DoD-chaired Project Officers Groups (POG) will take a more active role in warhead assessment while gaining a more detailed understanding of weapon life extension procedures. At the Department level, the joint DoD/DOE Nuclear Weapons Council (NWC) will remain the official forum for resolving inter-Departmental issues between the DoD customer and the DOE supplier of nuclear weapons technology. Additional information briefings will continue to be given to the NWC for review of critical issues involving the health of the nuclear weapons stockpile.

As an example of inter-Departmental cooperation, the DoD and DOE are currently formalizing a new annual certification procedure directed by the President for stockpiled weapons. This challenging task is being led by my office with the support and concurrence of representatives of the Services, the Joint Staff, Strategic Command, DOE, and the DOE laboratories. This new process will include an annual survey of the health of the entire stockpile. It will complement the newly implemented Dual Revalidation process which requires a detailed technical analysis of individual warhead types over a two to three year period. These two new reporting processes will provide timely information on warhead safety and reliability for the NWC.

Issues and the Future

The SSMP will require continuing support from the Departments of Defense and Energy, the Congress, the Administration, and the public. The DoD and DOE must jointly establish methods to measure success of the SSMP at specific intervals. We cannot afford to wait ten to fifteen years to judge the success of the program. DOE must demonstrate the ability to produce tritium and to rebuild all weapons types in the stockpile. Warheads consumed by the surveillance process must be replaced with certified warheads without the benefit of underground nuclear testing, a major undertaking. Most importantly, opportunities must exist to attract, train, and retain world class scientists and engineers who will be the next generation of stockpile stewards. The safety and reliability of our nation's nuclear stockpile demand an experienced cadre of our nation's best.

Since the Manhattan Project, the United States has invested heavily in the development, production, deployment, and maintenance of the national nuclear deterrent. Nuclear weapons, even at significantly reduced levels, remain a core component of future national security strategy. Our DoD/DOE shared responsibility is to ensure high confidence in our nuclear deterrent without underground nuclear testing. This enduring responsibility must have the resources necessary to ensure that the stockpile remains safe and reliable, today and in the future.

Mr. Chairman, members of the committee, absent nuclear testing, the potential for erosion in stockpile confidence will undoubtedly increase with time. To maintain high confidence is a challenge that exceeds those previously faced by our stockpile stewards, but I believe we are on the right track. The President recognized this challenge in his August 11, 1995 speech and remains committed to this challenge. The people in this room and the agencies they represent must meet this daunting requirement. This concludes my statement. I will be pleased to accept your questions now or for the record.

Statement of Joan B. Rohlfing
Director
Office of Nonproliferation and National Security
United States Department of Energy
FY 1997 Appropriations Hearings

Good morning Mr Chairman and members of the subcommittee It is my pleasure to address you today as the Director of the Office of Nonproliferation and National Security at the U S Department of Energy (DOE).

In recent years, the worldwide proliferation of Weapons of Mass Destruction (WMD) and their missile delivery systems has emerged as one of the most serious dangers confronting the United States This is a continuing and evolving problem with broad consequences for international security and stability At least 20 countries some of them hostile to the United States — already have or may be developing WMD through the acquisition of dual-use technology, indigenous development and production, and/or support from rogue supplier states Additionally, safety and security of existing nuclear weapons and materials are of increasing concern as economic and social pressures mount in countries such as Russia, Ukraine, Kazakstan and Belarus.

The President has made nonproliferation one of this nation's highest priorities. As the preeminent agency in nuclear materials and weapons technology and protection, the Department of Energy, through the Office of Nonproliferation and National Security, is uniquely suited to provide leadership in national and international efforts to reduce nuclear weapons worldwide, secure and prevent the spread of nuclear materials, technology and expertise, roll back nuclear weapons development programs, avoid proliferation surprise, and respond to nonproliferation emergencies We particularly draw upon 50 years of science and technology expertise resident throughout the DOE National Laboratory complex to help us achieve these goals

To reduce the international proliferation threat, the Office of Nonproliferation and National Security is focusing its resources and expertise on the following near-term priorities ① securing nuclear materials, technology and expertise in Russia and the Newly Independent States, ② maintaining effective protection, control and accountability of nuclear materials, technology and expertise in the United States, ③ limiting weapons-usable fissile materials worldwide, ④ ensuring transparent and irreversible reductions of global nuclear stockpiles, ⑤ supporting the completion of a Comprehensive Test Ban Treaty in 1996, ⑥ developing and integrating a program for preventing, detecting and responding to nuclear terrorism and smuggling, ⑦ controlling nuclear exports, and ⑧ strengthening the nuclear nonproliferation regime Through the unique scientific, technical, analytical and operational capabilities of the Department and its National Laboratories, we are working to effectively and efficiently accomplish these near-term priorities by marshaling and integrating our resources and nonproliferation activities.

Some of our most important international activities include conducting the government-to-government and laboratory-to-laboratory programs of cooperation between U S nuclear experts and their counterparts at nuclear facilities and institutes in the former Soviet Union to improve the protection, control and accountability of nuclear materials; assisting Russia and the Newly Independent States in establishing and enhancing nuclear material export control systems; developing advanced technologies and systems to detect the indigenous proliferation of WMD, to enable the verification of arms control treaties, and to facilitate the collection of intelligence information in noncooperative environments; conducting critical operations in cooperation with the Democratic People's Republic of Korea to stabilize and safely store spent nuclear fuel thereby both freezing the North Korean nuclear weapons program and enabling the application of effective International Atomic Energy Agency (IAEA) safeguards; working with the private sector to engage WMD weapons scientists, engineers and technicians in the former Soviet Union in activities which reduce the proliferation threat; and providing technical support of long-term monitoring of Iraqi facilities and other nuclear safeguards and emergency programs of the IAEA. In addition, we are providing unique and in-depth technical, arms-control, intelligence, research and technology expertise as part of the U.S. Government's integrated efforts to conclude negotiations, prepare for entry into force, and implement a CTBT.

The Department's unique technical and analytical capabilities allow us to play a pivotal role in the weapons of mass destruction arenas of the U.S. Intelligence Community. For example, DOE continues to contribute to National Intelligence Estimates and to support the Intelligence Community's Non-Proliferation Center in assessing the activities of emerging nuclear weapons states and terrorist organizations, the activities of states that supply nuclear materials and expertise, and theft and smuggling of nuclear material.

In concert with our international activities, we are responsible for conducting a wide range of domestic activities that support our nonproliferation and national security goals. These activities include: directing a rigorous safeguards and security program for the entire Department of Energy complex, thereby ensuring the demonstrated security of our own nuclear materials, technology and expertise; declassifying millions of DOE documents while protecting critical information that has the potential to facilitate the proliferation of weapons of mass destruction; and maintaining a security investigations and reinvestigations program for both Federal and contractor employees of the Department. We also provide technical, analytical, policy and implementation support to the efforts of the nation's policy community to deal with nonproliferation issues.

We also ensure the Department has a robust emergency management and response capability for nonproliferation, energy and nuclear emergencies. Through this program, we provide assistance to other government agencies as well as state, tribal and local governments. Over the past year, we have been providing emergency response experts to assist other foreign governments in reviews of their emergency preparedness plans and capabilities. Through the Partnership for Peace, we have been working with the Departments of State and Defense to assist Russia and the Newly Independent States to plan for and manage energy and radiological emergencies. We also have been working with the International Atomic Energy Agency, International Energy Agency and Arctic Environmental Protection Strategy to develop procedures and support plans for any radiological emergency.

ACCOMPLISHMENTS

Over the past year, we have demonstrated leadership and achieved significant accomplishments in each of our near-term priorities:

- In 1995, our cooperative efforts with Russia and the Newly Independent States in securing nuclear materials, technology and expertise, has protected over 8 tons of direct-use nuclear material with upgrades to 26 facilities' material protection, control and accounting programs Before the end of 1996, we expect to broaden this effort to over 35 facilities and protect hundreds of tons of plutonium and highly enriched uranium Additionally, we have begun discussions with the Russian Navy to begin upgrades on their nuclear facilities as well

- We have engaged nearly two thousand weapons scientists, engineers and technicians on 219 scientific projects at 77 institutes in Russia, Ukraine, Kazakstan and Belarus to prevent a "brain-drain" of these scientists to other countries that would employ them for their own indigenous nuclear weapons programs

- Our work in North Korea has effectively stopped their indigenous nuclear weapons development program We have a team currently in country canning the spent fuel to prevent its reprocessing for use in nuclear weapons Additionally, we have enabled the IAEA to apply international safeguards on the existing nuclear facilities remaining in North Korea

- We are the sole agency responsible for developing technologies to monitor and verify a Comprehensive Test Ban Treaty In 1995, we demonstrated significant progress in each of the sensor technologies required to support an international monitoring system: seismic monitoring, radionuclide monitoring, hydroacoustic monitoring, on-site inspection, space-based monitoring, and automated data processing One particular success is our improvement of the capability to more easily distinguish nuclear explosions from earthquakes — a formidable step toward a greater verification capability.

- In 1994, the Office of Nonproliferation and National Security completed installation of sensors on all Global Positioning Satellites that allow the United States to continuously detect near-earth and atmospheric nuclear explosions and verify treaty compliance worldwide In 1995 we began developing and deploying the next-generation of sensors to improve our detection capability

- We have also completed the first comprehensive assessment of all the chemicals that might be used in a nuclear weapons life-cycle This positions the United States to develop better techniques to detect an indigenous nuclear weapons program.

- Our declassification program has also played an instrumental role in furthering U.S. nonproliferation goals, especially in the initiative to achieve a bilateral agreement with Russia for the exchange of classified information to facilitate confirmation of transparent and irreversible nuclear weapons reductions.

- The Department's safeguards and security functions that were previously spread across the DOE complex are now consolidated within the Office of Nonproliferation and National Security. This achievement is an important step toward creating a responsive and efficient focal point for the Department's nuclear safeguards and security program and providing a national-level technical resource which is capable of fully supporting multilateral nuclear nonproliferation efforts

LOOK TO THE FUTURE

With our many achievements, there is much work to be done in our long and short term priority areas We cannot rest on our laurels and expect the global nuclear danger to reduce on its own. The programs of the Office of Nonproliferation and National Security seek to broaden their effects whereever they are able.

In the coming year and a half, the Department will accelerate efforts to provide enhanced materials protection, control and accounting for fissile materials in Russia and the Newly Independent States We hope to complete all MPC&A improvements in former Soviet Union states outside of Russia by the end of calendar year 1997 (with the majority of work being completed by the end of the fiscal year) In Russia, we intend to expand cooperation to the remaining facilities in the civil nuclear complex while continuing work with facilities related to the nuclear weapon complex. Our efforts with *Gosatomnadzor* (the Russian agency equivalent to the U.S. Nuclear Regulatory Commission) to design and promote an indigenous MPC&A standards system will ensure that Russian weapons usable material will be protected after the U.S. involvement has been completed The program as a whole anticipates upgrades at 50 locations in Russia and 13 locations in the Newly Independent States completed by the year 2002.

We are working to improve regional arms control and nonproliferation regimes through programs such as the Cooperative Monitoring Center (CMC) in Albuquerque, New Mexico. At the CMC, we assist political and technical experts from around the world acquire the technology-based tools they need to assess, design, analyze and implement nonproliferation, arms control and other security measures in their own regions. This particularly fosters regional security and lessens the desire for nations to acquire or develop their own weapons of mass destruction. We plan to further expand this effort with states of the Middle East, South Asia, the Koreas, and China.

In 1996, we hope to conclude an Agreement for Cooperation and a Stockpile Data Exchange Agreement with Russia that will allow us to gain insight into warhead dismantlement. These agreements will build confidence between our two nations that our mutual nuclear arms reductions are in fact occurring and irreversible.

These examples show that our activities are truly beneficial Through our robust and cost-effective programs, we are able to provide leadership in the nonproliferation community, further the nonproliferation goals of the United States, and ensure the national security

BUDGET REVIEW

The table below summarizes the fiscal year 1997 budget request for the Office of Nonproliferation and National Security from the Energy and Water Development Appropriation as compared with the fiscal year 1996 adjusted appropriation (in thousands)

Appropriation/Activity	FY 96 appropriated	FY96 comparable	FY 97
Program Direction[1]	—	$ 82,809	$ 95,622
Nonproliferation and Verification Research and Development	$ 216,142	210,718	194,919
Arms Control and Nonproliferation	160,964	145,057	181,244
Intelligence	42,336	30,957	29,185
Soviet-Designed Reactor Safety[2]	30,000	0	0
Nuclear Safeguards and Security	84,395	46,172	47,208
Security Investigations	20,000	20,000	22,000
Emergency Management	23,321	16,866	16,794
CONGRESSIONAL BUDGET REQUEST	***$ 577,158***	***$ 552,579***	***$ 586,972***

The Nonproliferation and Verification Research and Development budget request for fiscal year 1997 reflects a savings of $15 3 million This savings in part is a result of our effort to eliminate duplication between agencies and within DOE, improving coordination between sponsoring agencies, streamlining operations and generating a meaningful cost savings

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[1] The Fiscal Year 1997 budget request includes a new Program Direction line item as mandated by the Energy and Water Appropriation for Fiscal Year 1996. This new budget line item provides funding for salaries and benefits, travel, support service contractors and other related expenses associated with the overall management and administration of the Office of Nonproliferation and National Security

[2] The Soviet Designed Reactor Safety program is run by the Office of Nuclear Energy and funding for this program has been included elsewhere in the Other Defense Activities account.

The Arms Control and Nonproliferation budget request includes a net increase of $36 1 million concentrated in the area of material protection, control and accounting This increase is due to the rapid pace of expansion of cooperation with Russian facilities and is important to ensure early safeguarding of weapons usable material at their source. We are also expanding our efforts in the Reduced Enrichment Research and Test Reactor (RERTR) and Industrial Partnering Programs. The increase will also allow us to ensure that the canned spent nuclear fuel in North Korea is not used in an indigenous nuclear development program. Finally, the increase will provide increased analysis and support to U S nuclear arms control policies in the Middle East, Asia and South Asia, nuclear energy security issues in Asia, South Asia and Europe, and U.S. policies to deal with excess civil plutonium.

The Intelligence budget request reflects a modest reduction from fiscal year 1996 resulting from realized efficiencies The request will provide for timely, high-impact analysis and reporting on the proliferation implications of selected nuclear weapons states' programs, emerging nuclear proliferants, nuclear suppliers, and global impacts to the U.S. energy security.

The Nuclear Safeguards and Security budget request for fiscal year 1997 includes a net increase of slightly over $1 million Through a requested increase and reprioritization of funding needs, we intend to increase the Classification and Declassification budget by approximately $2 3 million This increase seeks to further develop advanced automation technology in support of the Declassification Productivity Initiative program and implement Executive Order 12958 on Classified National Security Information.

Finally, the Emergency Management budget request for fiscal year 1997 is unchanged from the fiscal year 1996 appropriation The change reflected in the summary table above is exclusively a result of consolidation of Program Direction funds.

CONCLUSION

Preventing the spread of weapons of mass destruction is a crucial aspect of our national interest, and the Office of Nonproliferation and National Security is uniquely capable to serve this national interest, especially through the efforts of our national laboratories. Our science and technology base enables us to provide unique solutions to national and international nonproliferation problems. The work we do benefits the nation's security across a broad spectrum: protecting nuclear material in the United States and worldwide; rolling back existing nuclear weapons development programs internationally, ensuring the verifiability of nuclear treaties, especially a CTBT; and responding to energy and nonproliferation emergencies.

U.S. Department of Energy
Office of Public Affairs
Washington, D.C. 20585
202/586-3640

BIOGRAPHY

JOAN B. ROHLFING

Joan B. Rohlfing was named Director, Office of Nonproliferation and National Security, by Secretary of Energy, Hazel R. O'Leary, on October 12, 1995. As Director, Ms. Rohlfing manages the Department's activities in the fields of arms control, nonproliferation, security affairs, energy intelligence, emergency management, and associated research and development. She also serves as the Senior Official of the Intelligence Community for the Department. Ms. Rohlfing served as Special Assistant to the Deputy Secretary of Energy for defense issues from September 1994 through October 1995.

Prior to joining the Department of Energy, Ms. Rohlfing served as a member of the professional staff of the House Armed Services Committee from 1991-1994 where she was responsible for advising the Chairman of the Committee on a range of defense policy and legislative issues. Her responsibilities included oversight of major military acquisition programs, and management of the annual development of the Atomic Energy Defense Activities legislation (Title 31) for the Defense Authorization Acts.

From 1989-1991 Ms. Rohlfing worked in the Office of the Secretary of Defense (OSD) as Assistant to the Director for Strategic Forces Policy. Ms. Rohlfing began her federal career in 1987 as a Presidential Management Intern in the Office of the Secretary of Defense. During her two year internship she served in professional assignments in OSD, the Joint Staff and the State Department. Prior to the Presidential Management Internship, Ms. Rohlfing worked as a consultant to the Rand Corporation in Santa Monica, California.

Ms. Rohlfing holds a Master of Public Administration degree from the University of Maryland, a Bachelor of Arts degree from the University of Illinois, and has completed additional graduate work at Stanford University.

December 12, 1995

WEAPONS ACTIVITIES

Mr. Myers. How do current programs and activities in support of the science based stockpile stewardship program at the national laboratories and weapons production complex differ from last year?

Dr. Reis. The major difference from last year is that the strategic backdrop to our program is much more clear than it was; we have a much better handle on the "why" and that is allowing us to focus much more tightly on the "what."

In the near term, we have worked with our customers in the Department of Defense to produce the Stockpile Stewardship and Management Plan (SSMP). The SSMP details the highest priority deliverables required to meet the needs of the DOD over the next five years. The SSMP thus provides a requirements driven, comprehensive planning framework for our technical activities, primarily for our new initiatives which are just now starting to take off; including the Life Extension Program, the Enhanced Surveillance Program, the Accelerated Strategic Computing Initiative, the National Ignition Facility, tritium source activities, and the physical transition of the complex. One major change from last year's program detailed in the plan is the decision by DOE to pursue a dual-track approach to developing a new tritium source.

The Draft Stockpile Stewardship and Management Programmatic Environmental Impact Statement, currently with the public for comment, lays out our road map for transitioning the weapons complex from one designed to handle cold war levels of production and relying on underground nuclear testing to one that will efficiently handle START I and II levels of activity without relying on underground nuclear testing. We have identified in the document our preferred alternative. This includes the necessary experimental facilities we propose to build as well as our plan to rightsize our production plants to meet our weapons responsibilities.

Mr. Myers. You are basically proposing a ten-year plan from the time underground nuclear testing has stopped until you have to redesign a weapon. Do we have to wait ten years to see if the science-based stockpile stewardship approach works?

Dr. Reis. We are not talking about redesigning weapons. Rather, our goal is to extend the stockpile's lifetime by 1) improved warhead assessment through advanced computational and experimental tools; 2) enhanced surveillance to characterize better the warhead's current condition and any age-related changes; and 3) lifetime extension to replace, when needed, those weapon components whose age-related change or deterioration may compromise its reliability or safety.

In science-based stockpile stewardship, we are constructing a program based on above-ground experiments, improved modeling and computational capabilities, data and expert knowledge archiving, and training new personnel. Before these new capabilities are in place, we will continue to rely on scientists and engineers with nuclear testing experience, who will continue to evaluate the safety and reliability of the stockpile, and who will be instrumental in training the next generation of scientists and engineers that will be the caretakers of the stockpile in the future.

These scientists and engineers will help develop the science-based program, and they will judge in an objective way, the program's progress and likelihood of eventual success.

Let me make clear that there is some technical risk in this new program. We have never been required to go so long without testing. Nevertheless, we have increasing confidence in our scientific tools, our stewardship program, and our focus on the weapons mission We at DOE, the laboratories, and plants believe we are well prepared to meet the challenge of stockpile stewardship without nuclear testing.

Mr. Myers. How can you show on an incremental basis, year by year, that the program is working?

Dr. Reis. The program should be judged by its progress and performance. We plan to develop performance measures for sustaining the safety and reliability of the stockpile for inclusion in the next revision to the Stockpile Stewardship and Management Plan. Past nuclear test data, much of it not well understood, will be reviewed and be placed on a more rigorous, scientific basis, re-computed with modern codes, compared to laboratory experimental data where relevant, and subjected to peer review and recertification standards. With these activities, and with the program's numerous ongoing outside reviews, the President, Congress, and others will be able to review on an annual basis the degree to which the program is succeeding or failing.

Mr. Myers. What examples can you give?

Dr. Reis. In Appendix C of the Plan, two classified instances are cited where the Stockpile Stewardship program has successfully resolved issues relating to the W76 and W87 warheads. In addition, we can point to findings from the current stockpile surveillance program and items in the FY 1997 budget narrative as other examples of progress to data.

Mr. Myers. Recent testimony by the General Accounting Office indicated that DOE has not conducted all of the tests - nonnuclear flight tests, nonnuclear systems laboratory tests, and laboratory tests of the nuclear components - that it believes are necessary to ensure the reliability of the nuclear weapons in the stockpile. Could you comment on their assessment that portions of all three major components of DOE's stockpile surveillance program have been and are currently behind schedule?

Dr. Reis. GAO recently testified regarding the DOE Defense Programs stockpile surveillance program as part of an ongoing audit titled "DOE's Ability To Maintain Nuclear Weapons" (Audit Code 302159). This testimony included a slide from Sandia National Laboratories depicting a "recommended" number of flight and lab tests and the compliance with those recommendations over the past four years. This slide is not a reflection of DOE policy.

Two to three flight tests per year per system is the current DOE requirement. While additional flight tests per year would improve the statistical precision of reliability, the current flight test sampling rate is adequate. In the case of laboratory tests, there is no formula for determining a number of required tests. The number of laboratory tests conducted is based on flight test experiences and engineering judgment. DOE and Sandia National Laboratories review the testing requirements annually.

Flight testing shortfalls (i.e. where less than 2 tests were conducted per year) exist for three systems: W62, W78, and W88. To conduct flight tests, DoD and DOE assets and support are necessary. Shortfalls are being addressed for all systems through scheduling additional tests with DoD. In the case of the W88, "new material sample data" from tests conducted on units as they were introduced into the stockpile is also available. For the W88 this data provides adequate test information, until additional flight tests can be conducted.

Laboratory component testing has also been delayed. The nonnuclear reconfiguration of the weapons complex has involved relocating testing functions and equipment from closed facilities to sites including the Savannah River Site, Sandia National Laboratories, and Los Alamos National Laboratory. This process is nearing completion. The testing backlog of plutonium bearing nuclear components is expected to be completed by the end of fiscal year 1996. Another factor leading to the delay of laboratory testing is the review of weapon safety studies. These studies must routinely be validated to permit weapon assembly and disassembly associated with testing. The process for completing safety studies is being revised to eliminate potential future impacts.

WEAPONS ACTIVITIES

Mr. Myers. We hear much about the danger of terrorists gaining access to nuclear weapons or nuclear materials. Aren't chemical and biological weapons equally dangerous and even more readily available to terrorists groups? How is this type of threat being handled?

Dr. Freedman. Chemical and biological weapons have long been recognized as relatively inexpensive weapons of mass destruction, primarily because they can be fabricated from components which are more readily available than fissile nuclear material. The DoD has several programs to address this threat. These options range from restricting access to chemical agent precursors and unique production equipment to active counterproliferation measures -- with the capability to detect, locate, and disarm chemical and biological weapons hidden by terrorist groups.

RUSSIAN NUCLEAR STOCKPILE

Mr. Myers. Can you confirm that the Russians are reducing the number of weapons in their nuclear stockpile at a rate comparable to the downsizing of the United States' nuclear weapons stockpile?

Ms. Rohlfing.

DELETED

Mr. Myers. The numbers of weapons shown in the active stockpile under START II assumptions remain the same, but the number of weapons remaining in the inactive stockpile has changed. Can you explain?

Dr. Reis.

DELETED

ACCELERATED STRATEGIC COMPUTING INITIATIVE

Mr. Myers. Describe the advanced strategic computing initiative.

Dr. Reis. The Accelerated Strategic Computing Initiative (ASCI) is a critical component of the Stockpile Stewardship and Management Program. It is a key part of the Department's response to Presidential decisions to halt nuclear weapons tests, halt new nuclear weapons design and production, and pursue a zero-yield Comprehensive Test Ban Treaty. ASCI will produce the weapon simulations, weapons phenomena models, applications and technologies needed to promptly shift from nuclear test-based methods to computation-based methods of assessment and certification of the performance, safety, and reliability of the nuclear stockpile.

The ASCI program is also a key part of the Department's response to maintaining confidence in the nuclear stockpile as components and systems age beyond their design lifetimes and as manufacturing and environmental constraints force changes in materials and fabrication processes. ASCI provides the simulation and computational capabilities necessary to support stockpile life extension and aging assessments, predict when upgrades are needed, ensure that upgrades can be made with full confidence without testing, and endeavor to assure that upgrades do not introduce new problems into the stockpile.

The creation of advanced simulation capabilities is the heart of the ASCI program. ASCI is designed as a balanced program to accelerate the development of nuclear weapons simulation codes, scientific understanding of weapon behavior, advanced computer platforms, and computing environments and infrastructure. These advances are essential for addressing the challenges of creating the only credible integrated test bed alternative to nuclear testing by using simulations for investigating performance, safety, and reliability of weapons in the nuclear weapons stockpile.

A credible integrated test-bed alternative to nuclear testing by using simulations is the central challenge of ASCI and science- based stockpile stewardship. Creating these weapon simulations requires a large sustained commitment by the national laboratories to the development of the 3D, high fidelity, comprehensive-physics, full-system simulation codes for each of the key performance, safety, reliability, and aging scenarios. ASCI will build on the existing core stockpile computing program at the weapons laboratories to develop the applications and simulation capability for integrated device assessments, and a predictive aging capability to enable extending the lifetime of the current stockpile.

Creating these weapons simulations also requires working closely with the computer industry to accelerate their capability to provide large scale computer systems that far exceed not only what is available today, but also far exceeds current industry predictions for what would be available a decade from now. This accelerated simulation, computation, and hardware developments are absolutely essential for stockpile stewardship success.

Creating these weapons simulations also requires working jointly with universities to advance key physics, materials, and computation R&D. The universities are viewed as important partners in the advancement of physics and other sciences, the development and demonstration of advanced computational tools to most efficiently utilize the emerging high-speed and high performance network and platform hardware and, most importantly, to validate the performance and reliability of major components of weapons relevant simulations that are verifiable through adjunct physical experimentation unavailable for the nuclear weapons application. To foster this partnership, the ASCI procurements of multi-teraop computers (ultimately computers capable of more than 100 teraops) (trillions of scientific opertions per second) have specified design and operational criteria to ensure that this unprecedented computing power and capability will be appropriately available in a timely fashion for use by members of the university and industry communities for work on unclassified activities that are generally supportive of the goals of ASCI.

The Accelerated Strategic Computing Initiative will develop the high-performance software applications needed to implement weapon simulation. Tightly integrated code teams will develop these codes. Code teams, proven to be highly effective in industry, are large interdisciplinary work groups whose objective is to produce coherent software packages that provide simulations embodying all the physics needed to predict the safety, reliability, performance, and renewability of weapons systems.

It is a formidable challenge to replace the empirical factors and adjustable parameters used in current calculations with predictive physical models. The simulation code development effort for ASCI will focus on applications in weapons physics, weapons engineering, and manufacturing science. These codes will be substantially more complex than any developed to date. They will integrate more refined physics, engineering models, 3-D capability, finer spatial resolution, and advanced numerical methods. The nuclear performance applications will be verified and validated using data from a range of non-nuclear test facilities and experimental results from historical underground tests. These applications will be designed for maximum performance on the new scalable computer systems. The development of computational, simulation, and hardware tools for performing complex tasks on high speed, secure platforms will not only obviate, on a technical level, the need for verification of results through underground nuclear tests and prototype performance validation tests, but will lead to an accelerated culture change of acceptance of the "no test" reality.

One goal of ASCI is an improvement of 10,000 to 100,000 times more than the design capability of current computers. ASCI will participate in multiple industrial research partnerships to accelerate current performance trends in supercomputers. It is not possible to predict which technology path will lead to the best results; indeed, it is unlikely that a single technical approach will serve all application needs. Therefore, we plan to pursue parallel research partnerships both in time and in technical approach in order to achieve a high payoff with manageable risk, ensure flexibility, and provide a diversity of technical solutions. To accelerate development of computer hardware, software, and communications we are planning an aggressive, integrated, and sustained approach, which accelerates important computer technology including: advancing the availability of very high performance computers--systems capable of 100's of high speed interconnect and encrypted links, high speed data storage systems, and highly flexible and robust distributed high performance computing (HPC) and visualization environments. This approach does not come cheaply. We believe, however, that the high cost of this program is justified.

The challenge and R&D opportunities of developing a credible integrated test-bed alternative to nuclear testing by using simulations has already markedly renewed the creative spirit among the scientists working on ASCI and science based stockpile stewardship. The early impacts of ASCI implementation is already helping us to attract world-class scientists and engineers, which is a critical part of our ability to achieve the capability to certify the safety, reliability and performance of the enduring stockpile and to retain and expand our scientific and technical preeminence in the technologies needed to preserve the stockpile and support the nation's emerging nuclear deterrence requirements.

Mr. Myers. How does it differ from all other computing work performed by DOE laboratories?

Dr. Reis. The ASCI program is focused on developing and validating the simulation and computational capability needed to promptly shift from nuclear-test based methods to science- and computation-based methods for stockpile stewardship. No other DOE program is working directly on developing comprehensive, 3D, high fidelity, complete-physics, and full-system simulation codes for the nuclear performance, nuclear safety, non-nuclear safety, reliability, aging, and renewal sequences that must be studied for assessment and certification of nuclear weapons. ASCI is developing capabilities specifically focused on stockpile stewardship and management. We are adapting and collaborating with other DOE and national programs where and whenever it is possible and are leveraging Defense Programs core computing efforts where leveraging makes sense. There is no duplication. The ASCI program seeks to work with other agencies as well as other parts of the Department on a variety of initiatives that are complementary.

The Accelerated Strategic Computing Initiative supplements the existing Core Computing program which was initially designed to support the test-based approach to stockpile management. Core Computing is dominated by two-dimensional codes, empirical and approximate models, and limited scope simulations. Core Computing currently is addressing near term stockpile issues. It was recognized that the Core Computing program was not scoped or focused to rapidly respond to the President's direction on testing. The Accelerated Strategic Computing Initiative was intended to supplement, rather than merely augment or replace, the core computing program. The Accelerated Strategic Computing Initiative has aggressively identified pressing computational and simulation issues, initiated development of complex codes, and driven the computer industry to develop on a much faster timeframe significantly more robust hardware platforms needed for the effective performance of the coming three dimensional computer codes and complex simulations. Both the core computer program and the Accelerated Strategic Computing Initiative are important components of both Stockpile Management and Science-Based Stockpile Stewardship.

Mr. Myers. How are industry and universities benefiting from this program?

Dr. Reis. The program started this fiscal year yet already there have been benefits to both industry and universities, and more are expected. To date the major industrial interface has been with the U.S. Computer industry. Our two computer procurements, code named Option Red and Option Blue, has spurred the industry to consider new and innovative ways to build the world's highest performance computer systems from commodity, high volume parts that are the mainstay of their business and technology plan. For example in the Option Red machine that will be built by Intel, we are using over 9000 Pentium Pro microprocessors. Furthermore, we have been told by a few of the companies that the DOE interest in accelerating performance in supercomputers is resulting in acceleration in selected areas of commodity computer technology.

We plan to work closely with universities to develop and validate the concepts of simulation, develop advanced computer science and numerical mathematics methods, and develop the required phenomenological and engineering models in key weapon physics area such as turbulence or hydrodynamics. Universities will gain significantly from the challenge of modeling at the state of the art in a number of key physics and engineering areas and also from access to the computational power that would have been out of reach, otherwise, for years, and was unimaginable just a short time ago. With this new computational and simulation capability the university community will be able to challenge a number of R&D problems in science and physics that will help to keep the U.S. universities in the lead in basic research.

There have already been substantial discussions initiated with colleges and universities; most of these to date have been individual lab investigator to individual university investigator. We will be expanding these in a few cases to cover broad topical areas of interest in weapons modeling, such as turbulence, corrosion, or parallel numerical mathematics, and simulation concepts. We are in the process of initiating a collaboration or have a grant or contract related to ASCI with the following institutions:

California Institute of Technology (multiple)
Dartmouth College
Harvard University
Indiana University
Massachusetts Institute of Technology
Oregon State University
Purdue University
Stanford University (multiple)
State University of New York at Stony Brook
Syracuse University
University of California, Berkeley (multiple)
University of California, Davis
University of Colorado (multiple)
University of Iowa
University of Michigan
University of Minnesota
University of New Mexico (multiple)
University of Tennessee
University of Texas, Arlington
University of Virginia (multiple)
University of Wisconsin

The work performed by the universities will benefit Defense Programs because it will accelerate the development of simulation code models, simulations, and software to work in the emerging teraop environment and will provide verifiable comparisons between physical confirmation and model predictions that will enhance the confidence in the performance of models and simulations used by Defense Programs for which there are no longer opportunities to determine on a large scale actual performance through physical testing.

WEAPONS ACTIVITIES

Mr. Myers. Please describe any programs in which the U.S. weapons laboratories are cooperating with their counterparts in Russia.

Dr. Reis. There are four major areas that involve the cooperation of the U.S. weapons laboratories with their counterparts in Russia. These are Scientific Exchanges, Industrial Partnering Program, Materials Protection, Control, and Accounting (MPC&A), and Surety (Safety and Security) Technology.

The U.S. nuclear weapons laboratories have been conducting scientific exchanges with Russian nuclear institutes for a number of years. In addition to the mutual scientific benefit derived from such interactions, the U.S. has been motivated by the desire to slow tendencies for human resources in the Russian nuclear complex to migrate outside the FSU, and to assist the application of Russian technical capability to mutually beneficial projects outside the nuclear weapons program. Scientific interactions have covered a number of technical areas, ranging from pulsed power technologies, high energy density science, experiments in ultra-high magnetic fields, development of infra-red electro-optic cameras, computational science including the development of parallel algorithms, materials science, and optical science.

The Department's principal instrument for securing weapons of mass destruction (WMD) technology and expertise (and removing incentive for Russian scientists to go to rogue countries or assist terrorist groups) is the New Independent States Industrial Partnering Program, or IPP. IPP was initiated pursuant to Section 575 of the Fiscal Year 1994 Foreign Operations Appropriations Act (P.L. 103-87). The objective of IPP is to engage scientists and engineers from weapons institutes of the NIS in peaceful applications of technology, leading to commercial benefits in both the United States and the NIS. The principal goal of the Program is to stabilize personnel and resources in the NIS that represent a proliferation risk. The approach of IPP is three-fold. First, the DOE national laboratories work with the NIS institutes to identify and evaluate the commercial potential of research and development at NIS institutes. Second, approved partnerships are cost-shared by U.S. industry. Finally, the objective is commercialization. The program leverages NIS intellectual capital, provides seed money to speed activity and lessen delay caused by uncertainty, and generates private sector-funded, self-sustaining projects that promote alternative peaceful employment and long-term stability for these individuals of concern. To date, over 200 projects have been initiated - 85 percent with institutes in the Russian Federation - including 175 "Lab-to-Lab" projects (Thrust I) and 32 industry cost-shared projects (Thrust II). Projects have engaged over 2,000 weapons scientists and engineers on projects ranging from materials science, to biotechnology, to instrumentation, to MPC&A, and so on.

The MPC&A Laboratory-to-Laboratory program is designed to complement the Government-to-Government program. It is based on traditional, longstanding scientific collaboration between Russian and American scientists who share an appreciation for the problems of nuclear security. The Laboratory-to-Laboratory Program expanded those scientific collaborations to include additional U.S. and Russian participants and to focus on high-priority joint work to achieve rapid progress in nuclear materials protection and control. Russian scientists have taken the initiative in identifying new opportunities, suggesting nuclear materials protection and control approaches that are most likely to work well in Russia, and "spreading the word" by informing their colleagues about improved materials control, protection and accounting concepts and methodologies.

In cooperation with the DOE, the nuclear weapons laboratories have pursued cooperative work with the Russian nuclear weapons institutes on nonsensitive topics related to safety and security technologies. Scientific exchanges and joint work have been pursued for the purpose of improving basic understanding and methods in the areas of risk assessment; response of systems to abnormal environments; accident resistant containers; transportation surety; hazardous materials management; and energetic materials safety. There is mutual benefit as we learn from the experience of each other and strengthen the safety and security technology base in the Russian nuclear complex.

Mr. Myers. Under what conditions would the U.S. consider performing an underground nuclear weapons test?

Dr. Reis. When the President announced his approach to the Comprehensive Test Ban Treaty (CTBT) on August 11, 1995, he stated: In the event that I were informed by the Secretary of Defense and Secretary of Energy--advised by the Nuclear Weapons Council, the Directors of DOE's nuclear weapons laboratories and the Commander-in-Chief of U.S. Strategic Command--that a high level of confidence in the safety or reliability of a nuclear weapon type, which the two Secretaries consider to be critical to our nuclear deterrent could no longer be certified, I would be prepared, in consultation with Congress, to exercise "supreme national interests" rights under the Comprehensive Test Ban Treaty in order to conduct whatever testing might be required.

PRODUCTION OF TRITIUM, PLUTONIUM, OR HIGHLY-ENRICHED URANIUM

Mr. Myers. What countries are still producing tritium, plutonium, or highly-enriched uranium?

Ms. Rohlfing.

DELETED

WEAPONS ACTIVITIES

Mr. Myers. Does the Department of Defense agree that a science-based stockpile stewardship program can provide adequate assurance of stockpile safety and reliability in the absence of underground nuclear weapons testing?

Dr. Freedman. Maintenance of a safe and reliable enduring stockpile of nuclear weapons is in the supreme national interest of the United States. Science Based Stockpile Stewardship is one approach that will address the need for confidence during a moratorium on testing and under a comprehensive test ban treaty. It may be possible, though by no means easy of certain, to have a stockpile stewardship program capable of furnishing an adequate level of confidence in the enduring stockpile without testing. Our level of confidence will depend on the nature and scope of the problems that arise in the enduring stockpile, the success and support of the stockpile stewardship program itself, and the ability to apply the tools of Stockpile Stewardship and Management to predict and solve these problems.

Mr. Myers. Does the Department of Defense have any concerns about the sufficiency of DOE's budget request for nuclear weapons activities, and the ability of DOE to maintain the professional cadre of nuclear weapons personnel to assure the safety, security and reliability of our nuclear deterrent?

Dr. Freedman. The FY 1997 budget will maintain an adequate level to sustain crucial capabilities. It is vital that functions delineated in the Nuclear Posture Review (NPR) (such as refabrication and certification of weapons in the enduring stockpile, enhanced surveillance, and weapons design capabilities) be performed by a trained staff of technical experts. One of the primary goals of the Science Based Stockpile Stewardship program is to develop and maintain an expert cadre of nuclear weapons scientists in an intellectually stimulating environment of applied research.

Mr. Myers. Does the Department of Defense have a position on the appropriate technology for tritium production?

Dr. Freedman. The Department of Defense supports the decision of the Nuclear Weapons Council (NWC) to follow a dual track approach to tritium production. The NWC endorsed accelerator production of tritium (APT) or using existing light water reactors as a possible means of meeting the needs of the stockpile. We expect a decision on the primary production technology to be made in 1998. The non-selected technology will, however, continue in development to serve as a valid secondary source should the other technology fail to meet our expectations. In any event, we must have an assured supply of tritium to sustain the stockpile.

TRITIUM

Mr. Myers. Can you briefly describe the current program to use commercial light water reactors to product tritium?

Dr. Reis. Details of the current program to use commercial reactors to produce tritium are described in Chapter VI of the Stockpile Stewardship and Management Plan, which will be submitted to Congress on April 16, 1996.

The Department's Commercial Light Water Reactor (CLWR) Project is investigating three alternatives for the production of tritium. First, DOE could purchase an operating CLWR and operate it to produce tritium. Second, DOE could purchase and complete an incomplete CLWR. Third, DOE could enter into agreements with one or more existing CLWR owners-operators and purchase their services to irradiate target rods in their reactors. In each of the alternatives, qualified target rods, acting and looking much like existing burnable poison rods, would be inserted into the CLWR for an 18-24 month fuel cycle, and then sent to Savannah River for tritium extraction and processing.

Near-term activities are focused on qualification of the target rod design, initial design and testing of a prototype extraction capability, and development and issuance of a request for proposal for providing irradiation services or selling existing commercial reactors. Additionally, the CLWR Project is addressing all legal, regulatory, policy, and public outreach issues relating to CLWR production of tritium.

Mr. Myers. What are the technical, legal, and regulatory issues concerning the use of a commercial light water reactor.

Dr. Reis. The Department's examination of the commercial reactor option to date suggests that there is no legal prohibition, either in statute or treaty, on the production of tritium in a commercial reactor. However, there are several legal issues that should be addressed by the Congress to assure that the commercial reactor option remains viable. For example, Energy and Water Appropriations language for FY 1996 prohibits in-reactor testing of tritium targets. The Department plans to initiate such testing as soon as late FY 1997, to confirm the promising results from prior target testing and to increase confidence in the target on the part of potential host utilities. Thus, it is important that the Department be permitted to conduct such testing. Section 57e. of the Atomic Energy Act of 1954, as amended could be interpreted as prohibiting the production of tritium for nuclear explosive purposes in a commercial reactor. In addition, the question of whether or not the Department should be subject to Nuclear Regulatory Commission licensing if it decides to purchase a commercial reactor must be resolved. If it is determined that the Department should be licensed by the Nuclear Regulatory Commission for that purpose, the Atomic Energy Act would need to be amended to authorize the Commission to license and regulate the Department for such purpose.

There are also bilateral agreements between the United States and Canada, Australia and Euratom, referenced in fuel contracts with utility companies, prohibiting the military use of uranium sold by those nations to United States utilities. Since all but two reactors in this country currently use uranium fuel made from foreign uranium, U.S. reactors that produce tritium to support the stockpile will probably have to use U.S.-origin uranium fuel, which will either be provided by the Department from its own supplies of uranium or for which the Department will have to pay the incremental cost over the foreign uranium now in use.

The regulatory issues associated with the commercial reactor option depend upon which course of action is pursued. For example, if irradiation services are sought by the Department, the utility or utilities involved would need amendments to their operating license(s) to permit tritium targets to be placed in the reactor in place of current burnable poison rods. Should the Department choose to purchase a reactor, regulatory issues related to transfer of the operating license to the Department, as well as the operating license amendment issues, would probably be involved. The use of an uncompleted reactor would add additional issues associated with the need to complete construction and obtain an initial operating license.

Based upon the design and development work that has been done thus far on the tritium target, the Department believes that the technical issues associated with the target itself are straightforward. Testing done to date suggests that the target design is very robust and will perform well in a light water reactor environment. Post-irradiation examination of remaining target rod segments irradiated several years ago and a series of confirmatory tests will be conducted in preparation for NRC review of the target design. In this regard, the staffs of the Department and the NRC have drafted a Memorandum of Understanding (MOU) that will guide interagency interaction regarding target qualification activities. The MOU will be ready for signature by Secretary O'Leary and Chairman Jackson shortly. Over the next 2 years, the Department will be preparing a topical report addressing technical and safety issues associated with the target design. This report will be submitted to the NRC for their technical review, and will be intended to assist in securing NRC acceptance of the target for use in commercial reactors.

Mr. Myers. Can you identify which utilities and locations have expressed an interest in this activity?

Dr. Reis. The Department solicited expressions of interest from utilities in December 1995. I would like to insert in the record the results of that solicitation. The information follows:

UTILITIES EXPRESSING INTEREST IN TRITIUM PRODUCTION

UTILITY	NUCLEAR POWER PLANT
Arizona Public Services Company	Palo Verde Unit 1 Palo Verde Unit 2 Palo Verde Unit 3
Centerior Energy	Perry
Florida Power and Light Company	St. Lucie Unit 2
Georgia Power Company	Alvin W. Vogtle Unit 1 Alvin W. Vogtle Unit 2
Houston Lighting and Power Company	South Texas Project Unit 1 South Texas Project Unit 2
Illinois Power Company	Clinton Power Station
Niagara Mohawk Power Company	Nine Mile Point Unit 1 Nine Mile Point Unit 2
North Carolina Municipal Power Agency Number 1 and Piedmont Municipal Power Agency	Catawba Unit 2
South Carolina Gas & Electric Company	Virgil C. Sumner
Tennessee Valley Authority	Bellafonte Unit 1 Bellafonte Unit 2
Virginia Power	North Anna Unit 1 North Anna Unit 2 Surry Unit 1 Surry Unit 2
Wisconsin Public Service Company	Kewaunee
Washington Public Power Supply System	WNP-1

UTILITIES EXPRESSING INTEREST IN PLUTONIUM DISPOSITION

UTILITY	NUCLEAR POWER PLANT
Arizona Public Services Company	Palo Verde Unit 1 Palo Verde Unit 2 Palo Verde Unit 3
Centerior Energy	Perry
Duke Power Company and Commonwealth Edison Company	McGuire Unit 1 Mc Guire Unit 2 Catawba Unit 1 Catawba Unit 2 Braidwood Unit 1 Braidwood Unit 2 Byron Unit 1 Byron Unit 2 LaSalle County Unit 1 LaSalle Unit 2
Entergy Operations, Inc.	Grand Gulf Nuclear Station River Bend Station
Florida Power and Light Company	St. Lucie Unit 2
Georgia Power Company	Alvin W. Vogtle Unit 1 Alvin W. Vogtle Unit 2
IES Utilities, Inc.	Duane Arnold Energy Center
Niagara Mohawk Power Company	Nine Mile Point Unit 1 Nine Mile Point Unit 2
North Carolina Municipal Power Agency Number 1 and Piedmont Municipal Power Agency	Catawba Unit 2
PECO Energy Company	Limerick Unit 1 Limerick Unit 2 Peach Bottom Unit 2 Peach Bottom Unit 3
Southern Nuclear Operating Company	Joseph M. Farley Unit 1 Joseph M. Farley Unit 2

Tennessee Valley Authority	Bellafonte Unit 1 Bellafonte Unit 2
Virginia Power	North Anna Unit 1 North Anna Unit 2 Surry Unit 1 Surry Unit 2
Wisconsin Public Service Company	Kewaunee
Washington Public Power Supply System	WNP-2

NON-UTILITY EXPRESSIONS OF INTEREST

COMPANY	INTEREST
AECL Technologies, Inc. -Team CANDU	MOX
COGEMA	MOX
Westinghouse Electric Corp.	Tritium & MOX
ABB-Combustion Engineering	Tritium & MOX
BNFL International Group	MOX
Utility Resource Associates	Tritium & MOX
BELGIONNUCLEAIRE	MOX
Lockheed Martin INEL	MOX
Advanced Nuclear and Medical Systems	Tritium

DEPARTMENT OF ENERGY

Record of Decision: Tritium Supply and Recycling Programmatic Environmental Impact Statement

AGENCY: Department of Energy

ACTION: Record of Decision: Selection of Tritium Supply Technology and Siting of Tritium Supply and Recycling Facilities.

SUMMARY: The Department of Energy (DOE) is issuing this Record of Decision regarding DOE's proposal for Tritium Supply and Recycling Facilities. The Department is making three simultaneous decisions. First, the Department will pursue a dual track on the two most promising tritium supply alternatives: 1) to initiate purchase of an existing commercial reactor (operating or partially complete) or irradiation services with an option to purchase the reactor for conversion to a defense facility; and 2) to design, build, and test critical components of an accelerator system for tritium production. Within a three-year period, the Department would select one of the tracks to serve as the primary source of tritium. The other alternative, if feasible, would be developed as a back-up tritium source. Second, the Savannah River Site is selected as the location for an accelerator, should one be built. Third, the tritium recycling facilities at the Savannah River Site will be upgraded and consolidated to support both of the dual track options. If the commercial reactor alternative is selected as the primary source, a tritium extraction facility will also be constructed at the Savannah River Site. The environmental analysis to support this decision was issued by the Department in the Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling (PEIS) DOE/EIS-0161 (October 1995). The PEIS identified the dual-track strategy described above as the preferred technology alternative. The Savannah River Site was identified as the preferred site for an accelerator, and the site for the upgrade and consolidation of existing recycling facilities. The Department has decided to implement the preferred alternatives.

FOR FURTHER INFORMATION CONTACT: Further information on the Final Programmatic Environmental Impact Statement can be obtained by calling 800-776-2765, or writing to:

Stephen M. Sohinki, Director
Office of Reconfiguration, DP-25
U. S. Department of Energy
P.O. Box 3417
Alexandria, VA 22302

Information on the Department of Energy National Environmental Policy Act process can be obtained by contacting:

Carol M. Borgstrom, Director
Office of NEPA Policy and Assistance, EH-42
U. S. Department of Energy
1000 Independence Ave. SW
Washington DC 20585
Telephone: (202) 586-4600 or (800) 472-2756

SUPPLEMENTAL INFORMATION: The Department of Energy has prepared this Record of Decision pursuant to the Council on Environmental Quality (CEQ) Regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA) (40 CFR Parts 1500-1508) and the Department of Energy regulations implementing the National Environmental Policy Act (10 CFR Part 1021). This Record of Decision is based on the *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (DOE/EIS-0161, October 1995) and the *Technical Reference Report for Tritium Supply and Recycling* (DOE/DP-0134, October 1995). The Technical Reference Report summarizes schedule, production assurance and cost data and presents the results of the uncertainty analysis. Several comments and a report from Congress were received after the documents listed above were published. This additional information was taken into consideration in preparing this Record of Decision.

In January 1991, the Department announced it would prepare a Programmatic Environmental Impact Statement (PEIS) examining alternatives for the reconfiguration of the Department's nuclear weapons complex. The framework for the Reconfiguration PEIS was described in the *Nuclear Weapons Complex Reconfiguration Study* (DOE/DP-0083), issued in January 1991. A Notice of Intent to prepare the PEIS was published in the *Federal Register* on February 11, 1991 (56 FR 5590). The purpose of the PEIS was to establish the locations for future weapons complex missions. The missions to be analyzed included plutonium and uranium component fabrication and processing, weapons assembly and disassembly, high explosive production, tritium recycling, and nonnuclear component fabrication.

At the time the Reconfiguration PEIS was begun, technology and siting alternatives for a new tritium supply facility were being examined in a separate New Production Reactor Capacity Environmental Impact Statement. On September 27, 1991, President Bush announced an initiative to reduce the Nation's nuclear weapons stockpile. In response to this initiative, the need for new facilities was delayed and the Department announced, on November 1, 1991, that it would delay decisions on the new production reactor technology and siting and include the environmental analysis for a new tritium production source in the Reconfiguration PEIS. The Department's intent to incorporate the New Production Reactor capacity analysis into the Reconfiguration PEIS was published in the *Federal Register* on November 29, 1991 (56 FR 60985).

In June 1992, the United States and Russia announced an arms reduction agreement which was signed in January 1993 as the START II Protocol. This agreement caused the most significant reductions to date in planned future weapons stockpiles of both nations. It also provided the Department with the opportunity to consider a much smaller weapons complex than previously envisioned. Therefore, the Department determined that it was necessary to reevaluate the Reconfiguration Program to insure that alternatives which reflected requirements of a greatly downsized nuclear weapons stockpile would be assessed in the PEIS. On July 23, 1993, a revised Notice of Intent was published in the *Federal Register* (58 FR 39528) which described a smaller, more integrated nuclear weapons complex. Additionally, long-term storage alternatives for plutonium and uranium were added to the analysis. As a result of this reevaluation and public comment, the Department published a notice in the October 28, 1994, *Federal Register* (59 FR 54175), that would separate the Reconfiguration PEIS into two separate analyses: the Tritium Supply and Recycling PEIS and Stockpile Stewardship and Management PEIS.

On March 1, 1995 the Department issued a *Draft Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (DOE/EIS-0161) which presented an analysis of the environmental impacts of the proposed action and alternatives. In the Draft PEIS, the Department indicated that the use of a commercial reactor was not a reasonable long-term tritium supply alternative due to concerns about the use of civilian reactors for military purposes. However, the Draft PEIS evaluated the impacts associated with the use of a commercial reactor to make tritium, whether such a reactor were used as a contingency source of tritium in the event of a national emergency, or the Department chose to purchase an existing reactor and convert it to a defense facility for long-term tritium supply. Comments received during the agency and public review of the Draft PEIS asserted that the use of an existing commercial reactor had the potential to be the lowest cost option and indicated confusion as to whether purchase of a commercial reactor or irradiation services from a privately owned reactor were treated as reasonable alternatives capable of meeting long-term tritium requirements. These comments and concerns prompted the Department to issue a *Federal Register* announcement on August 25, 1995 (60 FR 44327) in which the Department reopened the comment period for 21 days regarding its intention to treat both the purchase of irradiation services and the purchase of an existing or partially completed reactor as reasonable alternatives for long-term tritium supply. The Department summarized all comments received from both comment periods, prepared responses to the summaries, made revisions to the PEIS based on the comments, and identified its preferred alternative. The Notice of Availability of the Final Programmatic Environmental Impact Statement was published in the *Federal Register* on October 27, 1995 (60 FR 55021).

Comments have been received since the Notice of Availability was published asserting that there are errors in the analysis of cost, schedule and production assurance, especially regarding a new large Advanced Light Water Reactor. Comments were also received regarding the multipurpose reactor concept, and the use of the Fast Flux Test Facility at the Department's Hanford site to produce tritium. These comments are addressed in a subsequent section of this Record of Decision.

Alternatives Considered

Proposed Action: The Department of Energy proposes to provide tritium supply and recycling facilities for the Nation's Nuclear Weapons Complex. Tritium, a radioactive isotope of hydrogen, is produced in nature, but in very small amounts. Therefore, since it is an essential component of every warhead in the current and projected U.S. nuclear weapons stockpile, the amounts required must be man-made. Tritium decays at a rate of approximately 5.5 percent per year and must be replaced periodically as long as the Nation relies on a nuclear deterrent. Currently, the Department does not have the capability to produce the required amounts of tritium. The Department needs a capability that can produce tritium to meet the requirements set forth in the 1994 Nuclear Weapons Stockpile Plan, the latest official guidance. These requirements have been defined as a steady-state mode of 3/16 of the goal amount previously established for a nuclear reactor under the Department's New Production Reactors (NPR) program. The tritium supply source should also be capable of producing 3/8 of NPR goal amount if necessary either to eliminate inventory shortfalls or to support a larger stockpile size. The Department is currently meeting tritium requirements for the stockpile by utilizing tritium recycled from dismantled weapons. Ratification of the START II Protocol would mean that new tritium would be required by approximately 2011. The ability to meet an earlier date, if stockpile requirements should change, was also analyzed.

New tritium would be supplied, in either a reactor or accelerator, by irradiating target materials with neutrons and subsequently extracting the tritium in pure form for its use in nuclear weapons. The tritium recycling process consists of recovering residual tritium from weapons components, purifying it, and refilling weapons components with pure tritium. The

Department's tritium recycle facilities are located at the Savannah River Site (SRS) near Aiken, SC.

Four technology alternatives were evaluated for a new supply facility -- a heavy water reactor, an advanced light water reactor - both large (1,300 MWe) and small (600 MWe); a modular high temperature gas-cooled reactor; and a linear accelerator. Emerging design options for the heavy water reactor and the modular high temperature gas-cooled reactor were also reviewed. The advanced light water reactor and modular high temperature gas-cooled reactor alternatives were also evaluated as to the potential use of fuel fabricated from plutonium excess to weapons program requirements while simultaneously producing tritium and electricity (the so-called "multipurpose reactor"). Five sites were evaluated for a new facility -- the Idaho National Engineering Laboratory (INEL), near Idaho Falls, ID; the Nevada Test Site (NTS), near Las Vegas, NV; the Oak Ridge Reservation (ORR), Oak Ridge, TN; the Pantex Plant (Pantex), Amarillo, TX; and SRS. The Department also evaluated the use of existing commercial light water reactors, either through purchase of an existing or partially completed reactor that would be converted for the production of tritium or through purchase of irradiation services from a privately owned reactor. The purchase of an existing or partially completed reactor would allow the Department, should it choose to do so, to implement the multipurpose reactor concept. Such use is evaluated in the Final PEIS and the Technical Reference Report. Additionally, in accordance with CEQ regulations, the no action alternative (not providing a new supply of tritium) was evaluated.

Tritium recycling alternatives evaluated included no action (utilizing existing facilities at the Savannah River Site with no upgrades or consolidation), consolidation and upgrading of the existing facilities, or construction of new recycling facilities to be collocated with a new tritium supply facility if the Savannah River Site were not chosen as the site for a new tritium supply facility. The consolidation and upgrading of the Savannah River Site recycling facilities would support either a new tritium supply facility (if constructed at the Savannah River Site) or the use of an existing commercial reactor (if a commercial reactor were ultimately selected as a long-term tritium supply source or became necessary as a contingency source of tritium). In addition, a new tritium extraction facility would be constructed at the Savannah River Site.

Tritium Supply Technology Alternatives

This section describes each of the alternatives. The size of the facilities, land area requirements, and construction and operation workforces are presented.

1. *No Action*: No Action is presented for comparison with the action alternatives. Under No Action, the Department would not establish a new tritium supply capability, the current inventory of tritium would decay, and the Department would eventually not meet stockpile requirements for tritium.

Construct and Operate New Facilities

2. *Accelerator Production of Tritium (APT)*: An APT would accelerate a proton beam in a long tunnel toward one of two target/blanket assemblies located in separate target stations. Such an accelerator would be approximately 4,000 feet in length and would be housed in a concrete tunnel buried 40 to 50 feet underground. It would require approximately 550 MWe of electricity during peak production periods (to meet the 3/8 requirement) and 355 MWe to produce the steady-state requirement (to meet the 3/16 requirement) of tritium. In addition to the accelerator, the facility would include a klystron manufacturing and remanufacturing building as well as waste treatment, maintenance, operation, and administrative buildings, and a security infrastructure. Two target types are being analyzed, a helium-3 target which uses helium-3 gas to make tritium or a spallation-induced lithium conversion (SILC) target which uses lithium-6 to make tritium. The facilities required for the helium-3 target include target fabrication and target processing (including extraction) buildings. Facilities for the SILC target include target fabrication, target processing, and tritium extraction buildings. The APT complex would cover approximately 173 acres. Construction would take approximately 5 years and require approximately 2,760 workers

during the peak construction year. Operation of the APT would require approximately 624 workers.

3. *Advanced Light Water Reactor (ALWR):* The ALWR would be a high temperature, high pressure reactor whose primary purpose would be to produce tritium, but which would also generate substantial amounts of electricity. There are two options for the ALWR technology: a large ALWR (1,300 MWe) and a small ALWR (600 MWe). Both options use light (regular) water as the reactor coolant and moderator, and include a power conversion facility as an integral part of the design. The design of the ALWR complex would include an interim spent fuel storage building, a waste treatment facility, a tritium target processing facility, warehouses, and security infrastructure. Fuel rods would be purchased from commercial suppliers.

Large ALWR: The large ALWR complex would require approximately 350 acres. Construction would take approximately 6 years and approximately 3,500 workers during the peak construction year. Operation would require approximately 830 workers.

Small ALWR: The small ALWR complex would also require approximately 350 acres. Construction would take approximately 5 years and require approximately 2,200 workers during the peak construction year. Operation would require approximately 500 workers.

4. *Heavy Water Reactor (HWR)*: The HWR would be a low pressure, low temperature reactor whose sole purpose would be to produce tritium. The HWR uses heavy water (i.e. deuterium oxide) as the reactor coolant and moderator. Because of the low temperature of the exit coolant, a power conversion system designed to produce electrical power as an option would not be feasible. The conceptual design of the HWR complex includes a fuel and target fabrication facility, a tritium target processing building, an interim spent fuel storage building, a general services building, and security infrastructure. The HWR complex would cover approximately 260 acres. Construction would take somewhat less than 8 years and require approximately 2,320 workers during the peak construction year. Operation would require approximately 930 workers.

Small Advanced HWR: The small advanced HWR is an emerging design variation of the HWR. The design output of the small advanced HWR would be 470 MWt compared to 990 MWt for the HWR. It would have the same configuration of support buildings although they would be somewhat smaller. The design could be developed to produce tritium to meet steady-state tritium requirements, or modified to meet peak capacity requirements. The total area required for the complex would be 150 to 170 acres. Construction would take approximately 5 years and require approximately 1,800 workers during the peak year of construction. An operational workforce has not been estimated.

5. *Modular High Temperature Gas-Cooled Reactor (MHTGR)*: The MHTGR would be a high temperature, moderate pressure reactor whose primary purpose would be to produce tritium, but which would also generate substantial amounts of electricity. The MHTGR would use helium gas as a core coolant and graphite as a moderator. A steam cycle MHTGR would use a heat converter to transfer the heat from the helium coolant to feedwater producing super-heated steam which is then used to drive a turbine in the production of electricity.

The steam cycle MHTGR requires three 350 MWt reactors to produce the maximum (3/8) requirement of tritium. Because of the high temperature of the exit coolant, a power conversion facility designed to produce electricity is an integral part of the design. The design of the MHTGR complex, in addition to the three reactors, includes a fuel and target fabrication facility, a tritium target processing facility, helium storage buildings, waste treatment facilities, interim spent fuel storage facility, general services building, security infrastructure, and power conversion facility. The MHTGR complex would cover approximately 360 acres. Construction of the MHTGR would take about 9 years and require approximately 2,210 workers during the peak construction period. Operation would require approximately 910 workers.

Direct Cycle MHTGR: A direct cycle MHTGR is an emerging design variation of the steam cycle MHTGR. In this design the primary helium coolant drives a turbine generator through a gas-compression/gas-expansion, heating/cooling cycle. Two 600 MWt direct cycle reactors would be needed to produce the maximum (3/8) requirement of tritium. The support facilities, resource

requirements, and environmental impacts of the direct cycle MHTGR are similar to the steam cycle MHTGR. A two reactor direct cycle MHTGR would require fewer operating personnel than the three module steam cycle MHTGR.

Use Existing Reactors

6. *Existing Commercial Reactors*: The purchase by the Department of an existing operating reactor, the purchase of a partially completed reactor, or the purchase of irradiation services from a commercial power reactor(s)(with an option to purchase the reactor) are the three options evaluated which utilize existing facilities. Commercial light water reactors use both pressurized water and boiling water technologies. The Department has conducted significant development work on tritium targets for pressurized water reactors. Significant additional development work would likely be required to develop a target for a boiling water reactor. The Department plans to proceed with development of the target for the pressurized water reactor, but has not ruled out the use of boiling water reactors if industry demonstrates an advantage to the Department in developing such a target.

Commercial pressurized water reactors are high-temperature, high pressure reactors that use ordinary light water as the coolant and moderator and are capable of generating large amounts of electricity through a steam turbine generator. A typical commercial light water reactor facility includes the reactor building, turbine generator building, auxiliary buildings, interim spent fuel storage facilities, cooling towers, a switchyard for the transmission of electricity, maintenance buildings, administrative buildings, and security facilities.

Purchase of a Operating Commercial Light Water Reactor or Purchase of Irradiation Services: Approximately 72 to 127 workers (depending upon the number of reactors utilized) would be added to the work force because of the tritium activities. New fencing and security buildings may be required to support additional security requirements. Road access restrictions or construction of new roads may also be required.

Purchase of a Partially Constructed Commercial Light Water Reactor: The number of construction workers and the length of the construction period would vary depending on the percentage of completion of the plant. Data were available for a two-unit reactor plant with one unit 45 percent complete and the second unit 85 percent complete. The schedule data estimated completing the 45 percent complete unit in 5 years or both units simultaneously in 7 years. Since the Department is only interested in one unit, the 5 year estimate was selected. It is possible that the 85 percent unit could be completed in a shorter time. For the 45 percent complete unit, peak year workers were estimated to be approximately 2,065. The 85 percent complete unit would require a peak work force of approximately 1,525. Operations would require approximately 830 workers.

Other Missions Beyond Tritium Production

Multi-Purpose Reactor Concept: The ALWR, MHTGR, and the purchase options of the commercial reactor alternative would also be capable of utilizing fuel fabricated from excess plutonium to make tritium and generate electricity. To "burn" plutonium in an ALWR or a commercial light water reactor, a plutonium Pit Disassembly, Conversion, and Fuel Fabrication Facility would be needed to fabricate the plutonium and uranium (mixed oxide) fuel rods. For the MHTGR, only a plutonium Pit Disassembly and Conversion Facility would be needed, because the MHTGR design already includes a fuel fabrication facility. The MHTGR, if used to "burn" plutonium, would utilize fuel fabricated solely from plutonium without blending it with uranium. However, because tritium production declines significantly in a plutonium-fueled MHTGR, twice as many reactors would be necessary in order to produce the steady-state (3/16) tritium requirements. The need to include a plutonium Pit Disassembly, Conversion, and Fuel Fabrication facility for the ALWR and commercial reactor options, and the need for plutonium Pit Disassembly and Conversion Facility and more reactors for the MHTGR, would be major contributors to potential direct environmental impacts.

If an ALWR or commercial light water reactor were used as multi-purpose facilities, the new plutonium Pit Disassembly, Conversion, and Fuel

Fabrication Facility would cover up to 129 acres and require a peak construction work force of approximately 745 during the 6-year construction period. Operation would require approximately 650 workers. If an MHTGR were used as a multi-purpose reactor, the new plutonium Pit Disassembly and Conversion Facility would cover up to 30 acres and require a peak construction work force of approximately 125 during the 6-year construction period. Operation would require approximately 520 workers.

Recycling Facilities

The tritium recycling facility processes and recycles tritium for use in nuclear weapons. This includes emptying reservoirs returned from weapons in the stockpile, recovering and purifying the tritium, reclaiming reusable reservoirs, providing new gas mixtures, and refilling reservoirs. The facility also tests reservoirs and provides appropriate waste management activities.

1. *No Action*: The Department currently operates tritium recycling facilities at the Savannah River Site. These facilities would continue to operate without modifications or consolidation to meet environmental, health, and safety requirements, or to maximize efficiencies. Environmental impacts would not change from those experienced today.

2. *Construct New Facilities*: If the tritium supply and recycling facilities were to be located at any site other than the Savannah River Site, new recycling facilities could be collocated with the supply facilities. The tritium recycling activities would be housed in two buildings for operations and several support facilities. All tritium handling activities would be completed in the tritium processing building, which would be designed to contain tritium releases should they occur. An auxiliary building would house non-tritium activities and extremely small amounts of working tritium. The recycling facilities would cover approximately 196 acres. Construction would take approximately 4 years and require approximately 335 workers during the peak year of construction. Operation of the recycling facilities would require approximately 910 workers.

3. *Upgrade Existing Facilities at Savannah River Site*: There are two options for the upgrade of recycling facilities at the Savannah River Site. The first, the unconsolidated upgrade, would result in the continued use of all existing facilities and thus no consolidation of tritium handling activities. Five buildings would be upgraded in order to meet environmental, health, and safety requirements. No additional land area would be required. Construction of the upgrades would take approximately 3 years and require approximately 26 workers during the peak construction year. Operations would require approximately 970 workers.

The second option, the consolidated upgrade, would result in closing one building and transferring its functions to two existing buildings. Four buildings would be upgraded to meet environmental, health, and safety requirements and one to accept the transferred activities. The land area required for the facilities would not change. Construction would take approximately 3 years and require approximately 36 workers during the peak construction year. Operations would require approximately 910 workers.

Siting of New Tritium Supply Facilities

New tritium supply facilities, if constructed, would be located at one of five sites currently owned by the Department. These five sites are:

1. *Idaho National Engineering Laboratory*: The INEL is situated on approximately 570,000 acres, approximately 50 miles west of Idaho Falls and presently employs approximately 10,100 workers. The site has been used to test, build, and operate nuclear facilities. Research and development activities include reactor performance studies, materials testing, environmental monitoring, waste processing, breeder reactor development, and naval reactor operator training. Currently, there are four operational reactors. In addition to nuclear research, INEL supports processing and/or storage of high-level, low-level, and transuranic radioactive wastes.

2. *Nevada Test Site*: The NTS is situated on approximately 854,000 acres, 65 miles northwest of Las Vegas. Approximately 6,850 workers are presently

employed at the site. The site is a remote secure facility for conducting underground testing of nuclear weapons and evaluating the effects of nuclear detonations on military communications, electronics, satellites, sensors, and other materials. NTS is also the location of a low level radioactive waste management facility.

3. *Oak Ridge Reservation*: The ORR is located on approximately 35,000 acres, 20 miles west of Knoxville, TN. Approximately 15,000 workers are presently employed at the site. It includes three major facilities: the Oak Ridge National Laboratory; Y-12 Plant, and the K-25 site. The Oak Ridge National Laboratory conducts basic and applied scientific research and technology development. The K-25 site is the location of the former Oak Ridge Gaseous Diffusion Plant. It currently serves as an operations center for environmental restoration and waste management programs. Y-12 is the primary location for nuclear weapons activities at Oak Ridge. These include the dismantling of nuclear weapons components, maintaining uranium and lithium component fabrication capabilities, and storing special nuclear materials.

4. *Pantex Plant*: The Pantex Plant is located on 10,000 acres, 17 miles northeast of Amarillo, TX. Approximately 3,400 workers are presently employed at the site. Activities at Pantex include fabrication of chemical explosives, nuclear weapons assembly and disassembly, testing, repair and disposal of nonnuclear components, and development activities in support of the national laboratories. Pantex also is the interim storage site for sealed plutonium components from dismantled weapons.

5. *Savannah River Site*: The SRS is situated on approximately 198,000 acres, 12 miles south of Aiken, SC. Approximately 20,300 workers are presently employed at the site. Currently, tritium recycling operations to support nuclear weapons activities are conducted at the SRS. Other activities include interim storage of plutonium, waste management, and environmental monitoring and restoration. Past activities at SRS have included nuclear fuel and tritium target fabrication, operation of reactors for nuclear material production, chemical separation for recovery of plutonium and plutonium isotopes, tritium extraction, and uranium fuel reprocessing. The facilities

that supported these past activities are currently supporting waste management and environmental cleanup activities and will ultimately be decommissioned and decontaminated.

Commercial Reactor Site: The commercial light water analysis does not evaluate a specific site. Currently, commercial light water reactors are operating on 59 sites in 32 states. Approximately one-half of these sites contain two or three nuclear units. The sites range in size from 84 to 30,000 acres. The largest use of the sites is for cooling systems, including reservoirs and artificial lakes, and safety buffer areas. Analysis of specific candidate reactors would be conducted in a separate NEPA document.

Preferred Alternative

Based on the analysis presented in the PEIS and Technical Reference Report, the Department announced a preferred alternative in the FINAL PEIS. The preferred alternative is a acquisition strategy that assures tritium production for the nuclear weapons stockpile rapidly, cost effectively, and safely. The preferred strategy is to begin work on the most promising production alternatives of purchasing an existing commercial light water reactor or irradiation services with an option to purchase the reactor for conversion to a defense facility, and to design, build, and test critical components of an accelerator system for tritium production.

The Savannah River Site was designated as the preferred site for an accelerator, should one be built. The preferred alternative for tritium recycling and extraction activities was to remain at the Savannah River Site with appropriate consolidation and upgrading of current facilities, and construction of a new extraction facility.

Tritium Supply Evaluation

This section describes the results of the Department's evaluation of each of the alternatives. It summarizes their environmental impacts, costs, and schedule and production assurance risks. The evaluation of schedule, production assurance and costs were completed by developing base estimates and then conducting a formal assessment by experts to determine the risk. The risk is presented as the probability of achieving a specific objective. Base cases were developed for six schedule components, production capacity and availability, and five cost components. The estimates were normalized to insure consistency across all tritium supply alternatives. Technical experts (different groups for schedule, production assurance, and cost) were asked to provide judgments of the probability of success of the base estimates for each of the schedule components, capacity and availability, and each of the cost components. In addition, potential technical, regulatory, or institutional problems were identified for each tritium supply alternative and their probability for causing schedule delay, production assurance uncertainty or cost uncertainty were assessed. The impacts of the problems on schedule, capacity and availability, and cost were assessed. This information was combined through multiple simulations to develop probabilities of meeting various schedule, production assurance and cost objectives. The environmental impacts reported in the PEIS were evaluated for discriminators among tritium supply technologies and among sites.

The schedule, production assurance, and waste factors which discriminate among tritium supply technology alternatives are summarized in Table 1. These are: 1) the capability of meeting a schedule supporting a START II Protocol stockpile size; 2) the likelihood of producing the amount of tritium necessary to meet maximum (3/8) tritium requirements; 3) amount of additional spent fuel generated; and 4) amount of additional solid low level radioactive waste generated. Costs are presented in Table 2. They are divided into: a) total life cycle cost with revenue; b) total life cycle cost without revenue; c) total project cost; d) operations and maintenance cost; and e) revenue.

Additional environmental discriminators are the need for or generation of electricity, and cancer risk from a severe accident. The APT and HWR are users of electricity while the ALWR(s), MHTGR(s), and purchase of a partially completed or existing commercial reactor will result in the generation of additional electricity. The range between the potential amount of electricity used (550 MWe for the APT) and the potential amount of electricity generated

(1,300 MWe for the large ALWR) is 1,850 MWe. The amount of electricity used was evaluated for each candidate site against the capability of the power pool to supply electricity. No significant impacts on the pool or the ability to supply the required amounts were identified. A separate evaluation of the option of the construction and operation of a dedicated 550 MWe coal or gas-fired electrical generating plant was completed for the APT. The potential impacts of a gas-fired electrical generating plant were incorporated into the environmental analysis for each of the sites. The cancer risks attributable to a severe accident are, in absolute terms, very low for each alternative. However, in comparative terms, the APT clearly has a significantly lower cancer risk than any of the new facility reactor alternatives. Therefore, cancer risk is considered a discriminator between the APT and new reactor alternatives for the purposes of this decision. The results of the evaluations are described below.

Table 1. Schedule, Production Assurance, and Waste Discriminators

Alternatives	Probability of Delivering First Gas in 2011 [a]	Probability of Producing START I Amounts in Any One Year	Additional Spent Fuel Generated per Year (yd^3/yr)	Additional Solid Low Level Waste Generated (yd^3/yr)
No Action	0	0	0	0
APT	0.76	0.77	0	57[e]
Large ALWR	0.78	0.96	55	710
Small ALWR	0.78	0.89	36	660
HWR	0.40	0.93	7	5,200
Small Advanced HWR	<0.40[b]	0.79	<7[f]	<5,200[f]
Steam Cycle MHTGR	0.22	0.86	80	1,300
Direct Cycle MHTGR	<0.14 [c]	0.49	82	~1,300[g]
Purchase Existing CLWR	>0.99[d]	>0.96	40	160
Purchase Partially Complete CLWR	>0.99[d]	>0.96	Similar to Large ALWR	Similar to Large ALWR
Purchase Irradiation Services	>0.99[d]	>0.96	0 to 40 depending on number of reactors used	160

(a) Includes technical, regulatory, and institutional delays

(b) Due to emerging state of technology longer delays than HWR assumed

(c) Probability without any delays is 0.14. Delay would reduce this probability

(d) Assumes institutional questions are resolved

(e) For Helium-3 target; 544 yd^3/yr for SILC target

(f) No analysis completed, however, expected to be the same or less than the HWR

(g) No analysis completed, however, expected to be approximately the same as the steam cycle MHTGR

1. *Ability to meet required schedules.* To meet projected stockpile requirements for tritium, new tritium gas is required by 2011. This date is based on a stockpile consistent with the START II Protocol. Maintaining a stockpile consistent with the START I Treaty would require new tritium gas by 2005. The schedule analyses assumed a requirement to deliver tritium in 2011. A sensitivity analysis assessed the ability of the alternatives to deliver new tritium gas in 2005.

TABLE 2: Cost Evaluation Data at Savannah River Site (in Billions of 1995 Dollars)

ALTERNATIVES	Total Life Cycle Cost w/Revenue (a)			Total Life Cycle Cost w/o Revenue (a)			Total Project Cost (a)			Operations and Maintenance (b) Costs (a)		
	Low	Mean	High	Low	Mean	High	Low	Mean	High	Low	Mean	High
No Action	0	0	0	0	0	0	0	0	0	0	0	0
APT	3.6	5.1	7.8	3.6	5.1	7.8	2.0	3.0	5.5	1.4	2.1	2.9
Large ALWR	1.3	3.7	7.6	4.8	6.5	10.2	2.4	4.0	7.2	1.9	2.5	3.3
Small ALWR	1.5	2.7	4.5	3.2	4.2	5.8	1.6	2.3	3.9	1.4	1.8	2.5
HWR	4.3	5.8	8.1	4.3	5.8	8.1	2.6	3.8	6.4	1.4	2.0	2.9
Small Advanced HWR	2.9	4.2	5.7	2.9	4.2	5.7	1.8	2.7	4.1	0.9	1.5	2.1
Steam Cycle MHTGR	4.1	6.3	9.9	5.0	7.1	10.7	3.0	4.5	7.8	1.8	2.6	3.7
Direct Cycle MHTGR	3.0	5.0	8.3	4.2	6.0	9.5	2.5	4.1	7.4	1.4	1.9	2.6
Purchase existing CLWR	(0.8)	1.4	3.8	2.8	4.1	5.2	1.0	1.7	2.8	1.7	2.4	3.2
Purchase partially complete CLWR	0.1	2.0	4.4	2.9	4.4	6.6	1.1	1.9	3.4	1.7	2.5	3.8
Purchase Irradiation Services	0.8	1.2	1.7	0.8	1.2	1.7	0.3	0.5	0.7	0.5	0.7	1.1

(a) The costs are for steady-state production, discounted at 4.9% per year at SRS for new facilities. The low estimate corresponds to the 5th percentile of the cost probability distribution. The high estimate corresponds to the 95th percentile of the cost probability distribution.

(b) Operations and maintenance costs include decontamination and decommissioning costs.

The potential for technical or regulatory delays in the baseline schedule was also considered in assessing schedule uncertainties for each of the technologies. Technical delays relate to issues such as the maturity of the facility design, operational experience associated with the technology and maturity of the target design. Regulatory delays relate to the potential that independent reviews by organizations external to the Department could take longer than anticipated, either due to administrative licensing proceedings or to resolution of technical issues that delays design acceptance by the reviewing organization. By the end of 1995, a Task Force on External Regulation established by the Department is scheduled to present its recommendations whether the Department's nuclear facilities should be externally regulated, and if so, by what entity. While a number of different outcomes are possible as a result of the Task Force efforts, the Nation's commercial nuclear reactors are now regulated by the Nuclear Regulatory Commission (NRC). Therefore, in considering scenarios that involved regulatory delay, the Department used the NRC regulatory process and structure as the basis for this consideration, and assumed that an NRC license would be obtained for construction and operation of the reactor technologies.

Since the NRC has the greatest amount of experience with regulation of light water reactors, the potential regulatory delays associated with the light water options, either the new ALWR designs or the existing commercial reactor options, were assumed to be the shortest among the reactor technologies. Potential regulatory delays associated with the MHTGR and the HWR would be greater than for the light water candidates because changes to the NRC's regulatory structure would be required to license these technologies. While there will be technical and potential regulatory reviews associated with the APT design, the safety issues associated with this technology are not nearly as complex as those associated with any of the reactor technologies. Therefore, the potential for regulatory delays was assessed to be minimal. The purchase of an existing or partially complete commercial reactor would also require the transfer of a license to the Department, which would require a change to the Atomic Energy Act and corresponding changes to the NRC regulations.

While issues related to the new facility technologies are primarily technical and regulatory, existing commercial reactors are subject to an additional set of institutional issues that must be resolved before this option could be implemented to meet long-term tritium requirements. These center around concerns about the use of civilian commercial reactors for purposes which support military requirements. Such issues have been raised in the past predominantly in conjunction with the use of civilian reactors to produce special nuclear materials (highly enriched uranium and plutonium) which would, in turn, be used to make nuclear weapons. Any concerns will have to be addressed and resolved over the course of the next several years if the commercial reactor alternative options are to be utilized as the primary long-term source of tritium.

The no action alternative would not be able to produce new tritium. Therefore, it could not meet the schedule requirements.

Of the action alternatives, the commercial reactor options have the highest probability of meeting the 2011 start date, if there are no technical or institutional delays. However, as noted above, there are institutional issues related to their implementation. If these issues cannot be resolved, the commercial reactor alternative would remain only as a contingency source of tritium in the event of an emergency.

Even when delays or major issues are taken into account, the ALWRs, among the new facility alternatives, have a high probability of meeting the required 2011 start date. The base case construction schedule of the small ALWR is one year shorter than that of the large ALWR. However, the small ALWR has a higher risk of technical delays due to the uncertainties surrounding its passive safety system and potential regulatory delays, due to the fact that it has not yet received NRC design certification. The APT has only a slightly smaller probability of meeting the 2011 date compared to the ALWRs, and it is expected to have very few technical or regulatory delay problems. The HWR and the MHTGR would have difficulty in meeting the 2011 date.

The sensitivity analysis on producing tritium as early as 2005 assumed that the base schedules could be compressed by 2 years, and that no technical or regulatory delays would occur. It showed that the commercial options have a high probability (0.80 to 0.99) of meeting the 2005 date. The APT and the small ALWR have a small (0.20) probability of producing tritium by 2005 if no delays are experienced. None of the other alternatives could produce tritium by 2005.

The assessment also showed that the schedule for completing all activities to develop a multipurpose reactor would be similar or identical to that of the MHTGR, ALWRs, and purchase of a commercial reactor options if they are used for tritium production alone, as long as the tritium mission is given priority over the plutonium burning and electricity production missions.

In summary, the no action alternative is not able to meet tritium schedule requirements. The HWR and MHTGR have the potential for major technical or institutional delays; thus, there is a low probability of their making tritium by the 2011 start date. The ALWRs and the APT have a very high probability of delivering tritium by 2011. The commercial options have the highest potential for delivering tritium by 2011, if the institutional issues associated with the defense use of such facilities can be resolved. Only the commercial options have a high probability of delivering tritium by 2005, if that becomes a requirement.

2. *Ability to produce the required amounts of tritium.* Production assurance refers to the ability of the tritium supply alternatives to meet the annual production requirements for maintaining the tritium inventory. The steady-state (3/16) and maximum (3/8) production rates were used in the production assurance analysis.

The second column of Table 1 summarizes the results of the production assurance analysis in terms of the probability that a tritium supply option can meet the maximum rate in any given year. Since the facility is designed to operate for 40 years, a technology that produced at more than the maximum rate in any given year would produce excess tritium. If such a year is followed by a year that the technology produced at less than the maximum rate, the combination of years would still produce roughly the desired overall quantity of tritium over the 40-year lifetime of the facility. Thus, a production rate with a 0.50 probability of a rate meeting or exceeding the maximum rate in any given year provides a reasonable degree of production assurance. A 0.75 probability of meeting or exceeding the maximum rate every year is a high degree of production assurance, since it means that roughly during 30 years of the 40 years of production the maximum rate will be exceeded.

For all tritium supply alternatives, with the exception of the direct cycle MHTGR, there is a high probability of producing the required amounts of tritium (0.77 or higher). The direct cycle MHTGR has a moderate probability of production assurance (0.49).

The production assurance of a multipurpose reactor would not change from that of the MHTGR, ALWR, and commercial reactor purchase options, as long as tritium production is the primary mission of the facility. National security requirements mandate that tritium supply remain the primary mission of a multipurpose reactor.

In summary, the no action alternative has no chance of meeting the tritium production requirements. With the exception of the direct cycle MHTGR, all other alternatives have very high probabilities of meeting the steady-state and maximum production requirements.

3. *Environmental Impacts*. The Final PEIS presents numerous environmental impacts for a variety of resource areas for each of the new tritium supply facility alternatives at each of the five sites, and generic impacts for the commercial reactor options. The analysis was completed for meeting the maximum (3/8) goal requirement of tritium. Many of these impacts are very small. For example, the air quality impacts of all technological alternatives at all sites are very low. Most other impacts show little or no differentiation among alternatives. The evaluation of the tritium supply alternatives focuses, therefore, on the three environmental impacts that differentiate among the tritium supply alternatives: spent fuel generation, low level radioactive waste generation and risks from severe accidents. For all three of these area of environmental impact, the no action alternative would not change the status quo, i.e., no tritium would be produced. Therefore, it has the lowest environmental impact. This section presents the evaluation of tritium supply technology alternatives which are not site dependent. The following section presents the evaluation of the sites.

3.1 *Spent fuel*. Spent fuel is measured by the cubic yards of radioactive spent fuel rods produced during reactor operations in one year. The third column of Table 1 shows the annual amounts of spent fuel generated by the reactor supply alternatives. The new reactors generate spent fuel amounts ranging from 7 cubic yards to 80 cubic yards. The options to purchase an operating reactor or to purchase irradiation services would create up to 40 cubic yards of additional spent fuel (if only one reactor were utilized) due to shorter refueling cycles. If there were no change to the refueling cycles, no additional spent fuel would be generated. The option to purchase an incomplete reactor would create amounts of spent fuel comparable to those of the large ALWR. The APT does not generate any spent fuel. No additional spent fuel would be produced by virtue of the use of fuel fabricated from excess plutonium for the ALWR, MHTGR, or purchase commercial reactors options.

3.2 Low level radioactive waste. The fourth column of Table 1 shows the annual amounts of low level radioactive waste produced by the supply alternatives. For the new facility alternatives the HWR creates by far the most low level radioactive waste (5,200 cubic yards), followed by the other new rectors. The APT generates the least amount of low level radioactive waste (57 cubic yards) when using the helium-3 target, and 544 cubic yards when using the SILC target. The options to purchase an operating commercial reactor or to purchase irradiation services would create 160 cubic yards of additional low level radioactive waste due to the use of additional fuel rods and to handling additional radioactive materials. The option of purchasing an incomplete reactor would produce amounts of low level radioactive wastes that are similar to those of the large ALWR. A multipurpose reactor would generate about the same amount of low level radioactive waste as the reactor when used for tritium production alone. However, the plutonium Pit Disassembly and Conversion and Mixed-Oxide Fuel Fabrication Facility for the ALWR and commercial reactor options would generate approximately 540 cubic yards of low level radioactive waste annually. The plutonium Pit Disassembly and Conversion Facility for the MHTGR would generate approximately 10 cubic yards of low level radioactive waste per year.

3.3 Severe accidents. Risk is the probability of an accident occurring times the consequences of the accident if it occurred. Cancer risk to a population within a 50-mile radius of a facility is influenced by the size of the population within the radius. However, technologies can be compared if the same 50 mile radius is used for the analysis. For the purposes of comparison the SRS is used. The annual cancer risk from a severe accident to the population within 50 miles of the facility for the new reactor technologies is very low, ranging from 5.1×10^{-5} to 2.6×10^{-7} at the SRS. The

APT would have the lowest annual cancer risk (2.8×10^{-11}) for all the new facility alternatives. The options to purchase an operating reactor or to purchase irradiation services would pose no significant additional severe accident risks because of adding tritium production. The option to purchase an incomplete commercial reactor would have severe accident risks that are comparable to that of a large ALWR.

The use of plutonium as mixed oxide fuel in an ALWR or the purchase of commercial reactor options would not significantly affect the consequences of radioactivity releases from severe accidents though there would be some small changes in the source term release spectrum and frequency. The MHTGR would have twice as many reactors when operated in the multipurpose mode, and therefore, while extremely small, the accident risk for the MHTGR would double if used in this mode compared to the risk if used for tritium production alone.

An accident at a plutonium Pit Disassembly and Conversion and Mixed-Oxide Fuel Fabrication Facility for the ALWR and purchase of commercial reactor options would result in a small additional cancer risk from a severe accident if located at the SRS. A severe accident at the plutonium Pit Disassembly and Conversion facility for the MHTGR would also result in a small additional cancer risk.

In summary, the no action alternative has no additional environmental impacts. The APT and the commercial options to purchase an operating reactor or to purchase irradiation services, if the fuel cycle is not changed, generate no additional spent fuel, and have the lowest amounts of additional low level radioactive waste and cancer risks from a severe accident. The new reactor alternatives and the completion of a partially complete commercial reactor produce spent fuel and low level radioactive waste, and they present a very small additional cancer risk from a severe accident.

4. Affordability (Cost). For each action alternative, a range of costs, and the probability distributions over the range, were developed for Total Life Cycle Cost (TLCC), Total Project Cost (TPC), and Operation and Maintenance

(O&M). The O&M costs included decontamination and decommissioning. No costs were developed for the no action alternative. For the action alternatives, results were calculated for both undiscounted and discounted cost. The discount rate used was 4.9% per year in accordance with Office of Management and Budget guidance. The ALWR, MHTGR, and purchase commercial reactor options can produce revenues through electricity generation. The TLCC was calculated with and without revenues for these alternatives. Costs were estimated both for steady-state and maximum production rates.

The results of the cost ranges for steady-state production using discounted 1995 dollars are shown in Table 2. For each alternative a low, mean and high cost estimate is presented for TLCC with revenue, TLCC without revenue, TPC and O&M. The low estimate is the 5th percentile of the cost probability distribution, i.e., there is a 5% chance that the true cost will fall below the low estimate. The mean estimate is the average of the cost probability distribution. The high estimate is the 95th percentile of the cost probability distribution, i.e., there is a 95% chance that the true cost will fall below it.

The TLCC with revenue represents the estimated cumulative discounted net cost to the government or the taxpayers for each of the alternatives, since revenues from electricity sales would come to the government, not the Department. The Department must budget for all costs; therefore, the TLCC without revenue shows the estimated cumulative discounted cost to the Department. TPC represents the discounted capital cost estimates to develop, construct and make operational each alternative. The O&M costs are the discounted costs after the facility would become operational.

For TLCC with revenues (first column of Table 2), the option to purchase irradiation services has the lowest mean estimated cost (1.2 billion dollars) with uncertainty adding approximately 500 million dollars (95th percentile above the mean). The option to purchase an existing reactor has a mean cost of 1.4 billion dollars (17 percent higher than purchasing irradiation services) with uncertainty adding approximately 2.4 billion dollars. The option to purchase a partially complete commercial reactor has a mean cost of

2.0 billion dollars (67 percent higher than purchasing irradiation services) with uncertainty adding 2.4 billion dollars. The new reactor technology alternatives have mean costs that range from 2.7 billion dollars for the small ALWR (125 percent higher than purchasing irradiation services) to 6.3 billion dollars for the steam cycle MHTGR (425 percent higher than purchasing irradiation services). All new reactor alternatives have significant cost uncertainties, which add from 1.5 billion dollars (small advanced HWR) to 3.9 billion dollars (large ALWR). The APT has a mean cost of 5.1 billion dollars (325 percent higher than purchasing irradiation services) with uncertainty adding approximately 2.7 billion dollars. The large uncertainties create a substantial overlap in the cost distributions of the alternatives, except for the purchase of irradiation services.

For TLCC without revenues (second column of Table 2), the option to purchase irradiation services has the lowest mean estimated cost (1.2 billion dollars) with uncertainty adding approximately 500 million dollars (95th percentile above the mean). The option to purchase an existing reactor has a mean cost of 4.1 billion dollars (242 percent higher than purchasing irradiation services) with uncertainty adding approximately 1.1 billion dollars. The option to purchase a partially complete commercial reactor has a mean cost of 4.4 billion dollars (267 percent higher than purchasing irradiation services) with uncertainty adding approximately 2.2 billion dollars. The new reactor technology alternatives have mean costs that range from 4.2 billion dollars for the small ALWR and small advanced HWR (250 percent higher than purchasing irradiation services) to 7.1 billion dollars for the steam cycle MHTGR (492 percent higher than purchasing irradiation services). All new reactor alternatives have significant cost uncertainties, which add from 1.5 billion dollars (small advanced HWR) to 3.7 billion dollars (large ALWR). The APT has a mean cost of 5.1 billion dollars (325 percent higher than purchasing irradiation services) with uncertainty adding approximately 2.7 billion dollars. The large uncertainties create a substantial overlap in the cost distributions of the alternatives, except for the purchase of irradiation services.

For TPC (third column of Table 2), the option to purchase irradiation services has the lowest mean estimated TPC (0.5 billion dollars) with uncertainty adding approximately 200 million dollars (95th percentile above the mean). The option to purchase an existing reactor has a mean TPC of 1.7 billion dollars (240 percent higher than purchasing irradiation services) with uncertainty adding approximately 1.1 billion dollars. The option to purchase a partially complete commercial reactor has a mean TPC of 1.9 billion dollars (280 percent higher than purchasing irradiation services) with uncertainty adding 1.5 billion dollars. The new reactor technology alternatives have mean TPCs that range from 2.3 billion dollars for the small ALWR (360 percent higher than purchasing irradiation services) to 4.5 billion dollars for the steam cycle MHTGR (800 percent higher than purchasing irradiation services). All new reactor alternatives have significant cost uncertainties, that add from 1.4 billion dollars (small advanced HWR) to 3.3 billion dollars (Direct Cycle MHTGR). The APT has a mean TPC of 3.0 billion dollars (500 percent higher than purchasing irradiation services) with uncertainty adding approximately 2.5 billion dollars. The large uncertainties create a substantial overlap in the TPC distributions of the alternatives, except for the purchase of irradiation services.

The O&M costs make up the fourth cost item (fourth column of Table 2). The option to purchase irradiation services has the lowest mean estimated O&M cost (700 million dollars) with uncertainty adding approximately 400 million dollars (95th percentile above the mean). The option to purchase an existing reactor has a mean O&M cost of 2.4 billion dollars (243 percent higher than purchasing irradiation services) with uncertainty adding approximately 800 million dollars. The option to purchase a partially complete commercial reactor has a mean O&M cost of 2.5 billion dollars (257 percent higher than purchasing irradiation services) with uncertainty adding 1.3 billion dollars. The new reactor technology alternatives have mean O&M costs that range from 1.5 billion dollars for the small advanced HWR (114 percent higher than purchasing irradiation services) to 2.6 billion dollars for the steam cycle MHTGR (271 percent higher than purchasing irradiation services). All new reactor alternatives have significant O&M cost uncertainties, that add from 600 million dollars (small Advance HWR) to 1.1 billion dollars (steam cycle

MHTGR). The APT has a mean O&M cost of 2.1 billion dollars (200 percent higher than purchasing irradiation services) with uncertainty adding approximately 800 million dollars. The large uncertainties create a substantial overlap in the cost distributions of the alternatives, except for the purchase of irradiation services.

The costs of a multipurpose reactor were analyzed separately from the tritium supply alternatives. The Department's Fissile Materials Disposition Office and an independent contractor prepared separate estimates. Different discount rates were used in the reports, which also only identified the minimum and maximum cost range. The results of the independent analysis, in discounted 1995 dollars are: 1)$4.5 billion to $14 billion for a government-owned large ALWR, $2.9 billion to 8.6 billion for a small ALWR, and $2.7 billion to $9.9 billion for a commercial reactor option; 2) $5.2 billion to $25.4 billion for a privatized large ALWR, $3.1 billion to $14 billion for a small ALWR, and $1.9 billion to $11.3 billion for a commercial reactor option . The result of the Department's analysis, in discounted 1993 dollars, is: 1) for a government-owned large ALWR costs would range from $1.5 billion to $3.5 billion, and 2) for a privately financed large ALWR costs would range from $0.7 billion to $5.0 billion. These amounts include revenue from electricity sales.

In summary, the purchase of irradiation services is the lowest cost in all categories and has the lowest uncertainty. The other commercial options have the lowest cost estimates for TLCC both with and without revenues, and for TPC but with a higher degree of uncertainty. The APT, small ALWR, and small advanced HWR make up a middle group with approximately similar discounted mean costs for TLCC without revenue, and TPC. The small ALWR and small Advanced HWR have smaller uncertainties than the APT in both these categories. TLCC with revenue shows the small ALWR to have a lower mean cost than the APT or the small advanced HWR and adds the large ALWR to this middle group. The large ALWR is in the higher mean cost group for TLCC without revenue and for TPC, along with the MHTGRs and HWR, which also have higher uncertainties. The O&M analysis shows that the purchase of irradiation services has clearly the lowest mean cost, with all other alternatives grouped together. The uncertainties for all the alternatives generally have a substantial overlap in their cost distributions.

Evaluation of Site Alternatives

The five sites for new tritium supply and recycling facilities were evaluated with respect to environmental impacts and cost. Two criteria emerged as discriminators: 1) ability to handle low-level radioactive waste; and 2) cost. No siting analysis was needed for the commercial reactor options, since they all currently exist, and any reactor ultimately selected would have to undergo a separate NEPA review.

Numerous environmental impacts were examined in the Final PEIS. The analysis either showed very small or no impacts, or the impacts did not differentiate among sites including cancer risks from a severe accident. Impact differences are primarily due to the differences in the size of the population within 50 miles of the site. Because cancer risk is low for all sites, it is not a discriminator between sites. The cost estimates for site alternatives are published in the Technical Reference Report.

The results of the evaluations are summarized in Table 3 and described below.

Table 3: SITE EVALUATION

Criterion Site	Ability to Dispose of Wastes on Site	Cost of Adding non-Evaporative Cooling (Reactors Only) (a)	Percent Adjustment to Base Cost Site (INEL) due to Site Differences	
			Construction	Operation & Maintenance
INEL	Yes	$86 to $208	0%	0%
NTS	Yes	$99 to $239	5%	15%
ORR	Yes	$0	5%	0%
PANTEX	No	$98 to $239	-10%	15%
SRS	Yes	$0	0%	10%

(a) Mean discounted cost in millions of 1995 dollars, using a 4.9% annual discount rate

1. *Ability to Handle Wastes*. As shown in column 2 of Table 3, with the exception of Pantex, all sites can dispose of low level radioactive waste on site. The wastes from Pantex would be shipped to an approved off site low level radioactive waste disposal facility.

2. *Cost*. The results of the cost comparisons are shown in Table 3. Cost differences among sites are determined by three major factors:

1) the cost for the non-evaporative cooling system needed at sites which do not have ample water availability (this does not apply to the APT, which is not designed to use non-evaporative cooling),

2) the percentage differential in construction costs (primarily because of labor rates), and

3) the percentage differential in operation and maintenance costs (primarily because of labor and electricity rates).

The third column of Table 3 shows the range of additional costs due to the need for non-evaporative dry cooling for reactors at INEL, NTS, and Pantex. The high end of these costs would occur for the large ALWR.

The fourth and fifth columns of Table 3 show the percent increases in cost of construction, and operation and maintenance over the least expensive site (INEL). For construction, Pantex shows a decrease, SRS shows no change, and NTS and ORR show small increases. Operation and maintenance cost are higher at NTS and Pantex than INEL, with SRS higher than INEL but less than NTS and Pantex. ORR shows the same cost to INEL. These differences are fairly small compared to the large uncertainties in the actual costs of the facilities.

Evaluation of Tritium Recycling Alternatives

If a new supply facility is chosen at INEL, NTS, ORR, or Pantex, the alternatives are to build a new recycling facility collocated with the supply facility or to upgrade the SRS facility. Constructing a new tritium recycling facility (1.9 to 2.1 billion dollars) is more expensive (between $500 million and $750 million) than upgrading existing tritium recycling facilities (1.3 billion) at SRS. The operational environmental impacts would be similar.

If a new supply facility is chosen at SRS or if a commercial reactor option is chosen, upgrading the existing tritium recycling facility is the only option considered, since building a new recycling facility at another site is more expensive and has no other advantages.

Cumulative Impacts

Impacts from the siting, construction, and operation of new tritium supply and recycling facilities would be cumulative with impacts from existing and planned facilities and actions at the five candidate sites. The consequences of each new tritium supply alternative and recycling alternatives include the cumulative effect of tritium supply and recycling impacts and impacts from existing, planned, and reasonably foreseeable operations. Other more long-term impacts associated with the Department's proposed Environmental

Management Program and the Storage and Disposition of Weapons-Usable Fissile Materials Program are speculative at this time but could increase or decrease cumulative impacts, depending on the decisions resulting from the PEISs being prepared for these programs and the time frame of site-specific projects. Information on potential waste management activities at the candidate sites was included as appropriate in the assessment of waste management impacts in the Tritium Supply and Recycling PEIS.

The Storage and Disposition PEIS alternative of burning plutonium in a reactor could result in increased cumulative impacts at the candidate sites if this Record of Decision selected a new facility, and the Record of Decision for the Storage and Disposition PEIS selected a separate new reactor. The impacts of combining tritium production and plutonium disposition in a single reactor, the multipurpose reactor, were evaluated in the Tritium Supply and Recycle PEIS. Cumulative impacts from constructing two separate reactors would approximately double those presented for a single reactor in the Tritium Supply and Recycling PEIS. Cumulative impacts from construction of a APT for tritium production and a new reactor for plutonium disposition would be represented by adding together the APT and ALWR or MHTGR impacts evaluated in the Tritium Supply and Recycling PEIS. Cumulative impacts would be minimized if tritium production and plutonium disposition were to take place in a single reactor.

The Environmentally Preferable Alternative

The environmentally preferable alternative is the alternative that would cause the least impact to the physical environment, and best protect worker and public health.

With respect to all three decisions, the no action alternative is the environmentally preferable alternative. Under the no action alternative, tritium requirements to support the nuclear weapons stockpile would continue to be met by recovering residual tritium from weapons components, purifying it, and refilling weapons components. These activities would be performed at the Savannah River Site, the current location of this function. However, under the no action alternative, the Department would not establish a new tritium supply capability and the Department would not meet future stockpile requirements of tritium. This would be contrary to the Department's mission as specified by the Atomic Energy Act of 1954, as amended. Thus, no action is not a reasonable alternative.

Of the alternatives that would satisfy the Department's mission, the potential environmental impacts are generally small and, except for the commercial reactor options to purchase an existing reactor or irradiation services, the impacts are within the same range. The Department considers the commercial reactor options of purchasing an existing reactor or irradiation services to be the environmentally preferred alternative.

Implementation of either of these options would result in certain environmental impacts. The environmental impacts of construction activities would be limited to any support facilities that would be required. Operation of the commercial reactor options would have few potential environmental impacts. No additional spent fuel over and above what the reactor(s) would otherwise generate during their planned lifetime would be generated, assuming that operating scenarios do not change fuel cycles. If fuel cycles were changed, additional spent fuel would be generated.

There are no environmental grounds for discrimination among sites for the tritium supply alternatives. Therefore, the SRS is the environmentally preferred site since impacts from upgrading tritium recycling facilities are less than building new facilities at any of the other sites. Resource areas where no major differences exist, or where potential environmental impacts are small are: land resources, air quality, water resources, geology and soils, biotic resources, socioeconomics, and site infrastructure.

Comments on the PEIS and Related Documents

Several comments were received on the Final PEIS during the 30-day period following the filing of the Final PEIS with the Environmental Protection Agency (EPA). The EPA stated that all of its specific comments on the Draft PEIS had been adequately addressed in the Final PEIS. A vendor for one of the ALWRs commented that on the Final PEIS did not adequately reflect the fact that the electricity-producing reactor options have an environmental benefit. That is, construction of such a reactor would offset the need to build and operate an equivalent capacity of fossil-fueled power plants, whereas the accelerator would have an additional environmental impact from a power plant needed to provide electricity for operating the accelerator.

The Final PEIS assessed the environmental impacts associated with providing power to the APT. Two methods were assessed: (1) purchasing electricity from regional power pool grids; and (2) building and operating a dedicated power plant. If a new dedicated power supply were constructed, impacts would occur to air resources, land use, soils, biotic resources, and socioeconomics at the construction site. Operation of a dedicated power supply, or increase electrical demand on the power pool would result in increased impacts to air resources, water resources, waste management systems, and local traffic. Impacts to land use, soils, waste management systems, and biotic resources could occur at the plant location and along the transportation system supplying the coal or gas to the power plant. While these environmental impacts were assessed, no decision regarding a preferred source of power is appropriate at this time. If an accelerator were eventually built, the site-specific NEPA review would more fully explore the options of providing power to the accelerator, and the appropriate decision would be made at that time. The environmental impacts that could be avoided through the use of a multipurpose reactor are discussed qualitatively in the Final PEIS for both the ALWR, MHTGR, and commercial reactor alternatives. These impacts are presented as part of the cumulative impacts discussion in the previous section.

Additional comments on the Technical Reference Report and cost analysis were also received from the vendor for one of the ALWRs. The vendor questioned the basis of the cost estimate and the judgments used in developing the uncertainties related to schedule, production assurance, and cost as presented in the Technical Reference Report. The commentor presented a revised set of assumptions resulting in modifications to the cost ranges for the large and small ALWRs, APT and commercial reactor options. The Department does not agree with these assumptions. However, if these assumptions were accepted hypothetically, and applied consistently and appropriately to each of the ALWR, APT, and commercial reactor options, the result would be to increase the cost range of the purchase of irradiation services and lower the cost ranges of all other light water alternatives. Thus, there still would be significant overlap in the cost of these alternatives, and there would be no effect on the decisions presented in this Record of Decision. The Department selected experts knowledgeable in schedule, cost or production assurance for the assessment panels who did not stand to gain from the results of the assessment. In addition, each panel included experts knowledgeable in the different technologies and the mean results of their combined judgments were used in the uncertainty analysis.

The Department received on October 11, 1995, a Congressional report: "Getting On With Tritium Production: A Report to Speaker Newt Gingrich". The primary recommendation of the report is that the Department base its selection of a tritium production source on two objectives: maximizing the assurance that tritium sources will be available when needed and minimizing costs to the taxpayers. The Department's acquisition strategy described in this Record of Decision implements this recommendation of the Congressional report. Additional recommendations related to insuring that the plutonium disposition mission and the tritium production mission be reviewed for combining efforts to save money, and the new reactor option must be evaluated to the same level of detail as the commercial reactor options. The responsibility for tritium production and fissile material disposition rests with two separate offices in the Department, the preparation of the Tritium Supply and Recycle PEIS and Technical Reference Report was closely coordinated with the Office of Fissile Materials Disposition. Therefore, the option of using a reactor in a multipurpose mode is analyzed in these two documents and the factors relevant to decision making are presented in this Record of Decision. Due to the rapid decay of tritium, and the long lead time required to bring a new tritium source on line, even supplies of tritium from retired weapons are not sufficient to postpone the need for a tritium supply facility to the point where decisions concerning technology and site selection can be deferred. With regard to equal evaluation, the Department believes that the analysis completed to date accomplishes this recommendation. Cost considerations associated with the reactor alternatives point the decision toward existing commercial reactors. Moreover, a new reactor has no major schedule or production advantage over an existing reactor that would justify incurring the additional cost and environmental impacts associated with a new reactor.

A private group has recently suggested that it purchase the Fast Flux Test Facility (FFTF) from the Department and that the Department then contract with the private group to make tritium at that facility. In the PEIS, the use of FFTF was considered and dismissed as a long-term tritium supply option because the amount of tritium that it could produce would only meet a percentage of the steady state tritium requirements, and it was not reasonable to rely on operating the facility far beyond the end of its design life. However, the Department will evaluate the presentation made by the private group to determine whether the operation of the FFTF might be able to play any role in meeting future tritium requirements. If any changes are warranted to this Record of Decision following that review, or further NEPA documentation is required, the Department will take appropriate action.

Decision

The Department is making three simultaneous decisions regarding tritium supply and recycling. First, the Department will to pursue a dual track on the two most promising tritium supply alternatives: 1) to initiate the purchase of an existing commercial reactor (operating or partially complete) or irradiation services with an option to purchase the reactor for conversion to a defense facility; and 2) to design, build, and test critical components of an accelerator system for tritium production. Within a three-year period, the

Department would select one of the tracks to serve as the primary source of tritium. The other alternative, if feasible, would be developed as a back-up tritium source. Second, the Savannah River Site is selected as the location for an accelerator, should one be built. Third, the tritium recycling facilities at Savannah River Site will be upgraded and consolidated to support both of the dual track options. A tritium extraction facility will be constructed at Savannah River Site. The basis for these decisions is as follows.

Tritium Supply Decision: The options of the commercial reactor alternative are the best in terms of schedule, production assurance and cost. However, there are institutional issues with these options that must be resolved, or else the alternative can only be used as a contingency.

Institutional issues regarding the use of a commercial reactor(s) must be resolved. Since commercial reactors are already constructed and operating, adding the tritium mission to an existing reactor does not significantly increase any existing environmental impact. Using existing commercial reactors offers the least expensive approach. The purchase of irradiation services presents the lowest cost and has the lowest uncertainty. The purchase of an existing or partially completed commercial reactor has the lowest capital and life cycle costs but a greater degree of uncertainty than the purchase of irradiation services.

Among the new facility alternatives, the accelerator has the highest probability to meet earlier production requirements because of less regulatory uncertainty. Among the new facility alternatives the accelerator also has the least environmental impact because it does not use fissile material, generates no high-level wastes, and while the risk from a severe accident is very small for all of the alternatives, the risk for the accelerator is the smallest. While all of the components of the accelerator have been proven, the entire system needs to be demonstrated to assure the components work together as a complete system. From a cost perspective, the APT is grouped with the small ALWR and small advanced HWR in a middle range of costs if revenue is not taken into consideration. There is significant overlap among the alternatives, however. The two reactor alternatives have a smaller uncertainty than the APT. If revenue is included, the small ALWR has a lower mean cost than the APT and small advanced HWR. Also the large ALWR is added to this middle group. The Department has confidence that as we optimize the accelerator design over the next several years, the resulting costs will fall within the lower end of the cost range presented in the Technical Reference Report.

Based on the these considerations, the Department will implement a dual acquisition strategy that assures tritium production for the nuclear stockpile rapidly, cost-effectively, and safely. This dual track strategy for meeting tritium supply requirements provides the following advantages:

- Resolves major uncertainties over the next three years, before selection of the primary alternative;

- Selects the new facility that has the lowest estimated environmental impacts, an accelerator, and the environmentally preferred alternative, purchase of a existing commercial reactor or irradiation services;

- Lessens programmatic risk because it: 1) pursues two technically different and independent approaches which provide fall back in the event either approach develops significant problems; 2) provides proven independent capability to increase production; 3) develops and protects contingency capability to support requirements the event of a national emergency; 4) selects a strategy that has the greatest flexibility meet production requirements earlier than 2011, if necessary, and 5) includes the least cost option (irradiation services); and

- Preserves an option for simultaneous reactor "burning" of excess weapons plutonium, if the Storage and Disposition of Weapons - Usable Fissile Materials Record of Decision selects reactor burning of that material.

Site Decision: For the commercial options, the potential sites are where existing facilities are located. Selection will be subject to a separate NEPA analysis. For the APT, environmental impacts and costs are not significant discriminators. The Savannah River Site will be the site for the APT, if one is constructed, because it has the only existing tritium recycling capability and infrastructure of the candidate sites.

Tritium Recycling Decision: Upgrading and consolidating the tritium recycling facilities at the Savannah River Site is the least expensive option and avoids additional transportation of tritium between sites if the APT is constructed. Therefore, if the APT is the primary source of tritium, the existing tritium recycling facilities at Savannah River Site will be consolidated and upgraded. If one of the commercial reactor options becomes the primary source of tritium, the existing recycling facilities at Savannah River Site will be consolidated and upgraded, and a new extraction facility will be constructed.

Issued in Washington D.C. December Dec. 5, 1995.

Hazel R. O'Leary

Hazel R. O'Leary
Secretary

Mr. Myers. What are the technical, legal, and regulatory issues concerning accelerator production of tritium?

Dr. Reis. The technical issues are discussed in Chapter VI of the Stockpile Stewardship and Management Plan, which was submitted to Congress on April 16, 1996.

No legal issues have been identified. Regulatory issues are divided into facility safety, worker protection, and environmental compliance. The Programmatic Environmental Impact Statement for Tritium Supply and Recycling summarized the environmental compliance issues. Currently the operation of all Department of Energy (DOE) facilities is authorized by DOE and regulated by the DOE orders and regulations while meeting the environmental protection requirements of the Environmental Protection Agency (EPA) and the states. If the Department were to be subjected to external regulation for nuclear safety, which would require new legislation, new regulatory issues would likely arise, but it is not possible to predict now what those issues might be.

Mr. Myers. At the current stockpile size, can the accelerator meet future tritium demands?

Dr. Reis. Yes. The design capacity for the accelerator production of tritium is currently set at 2 kg per year, with provisions to increase production to 3 kg per year. At conceptual design these will be adjusted to the actual requirements plus a margin for ease of operation. The accelerator can easily exceed the requirement set in the current Nuclear Weapons Stockpile Memorandum.

Mr. Myers. How is funding for tritium in fiscal years 1996 and 1997 allocated by activity?

Dr. Reis. I would like to insert in the record a table showing the budgets for the 2 fiscal years. The information follows:

TRITIUM FUNDING

	FY 1996	FY 1997
Accelerator Production of Tritium	$ 62M	$ 85M
Commercial Reactor Production	$ 13M	$ 15M
Total	$ 75M	$100M

RECONFIGURATION OF THE WEAPONS COMPLEX

Mr. Myers. How will downsizing and modernizing the nuclear weapons production complex impact employment at the four production sites and the weapons laboratories?

Dr. Reis. Employment at the four plants will be reduced over the next 7 years consistent with the reduced production workload and the reduced facility size. Exact employment levels can not be predicted with certainty because of the uncertainty in future work. The range of expected employment at each plant is Kansas City, a range of 2,350 to 2,900; Pantex, a range of 1,450 to 1,900; and at the Oak Ridge Y-12 Plant, a range of 3,900 to 4,500.

Mr. Myers. The proposal includes production of plutonium pits at Los Alamos National Laboratory. Does the Department anticipate any legal problems in placing this mission at Los Alamos?

Dr. Reis. DOE knows of no legal restriction with establishing the plutonium pit fabrication mission at Los Alamos, and does not anticipate any legal problems in placing this mission at Los Alamos..

Mr. Myers. Please identify any other sites that were considered for production of plutonium pits, and explain why they were eliminated.

Dr. Reis. The draft Stockpile Management Preferred Alternatives Report shows the cost comparison for the Los Alamos National Laboratory (LANL) versus the Savannah River Site (SRS) alternatives for pit production. In general, it was found that the SRS alternative was more expensive, would take longer to implement, and would involve greater technical risk. Pit production could not be established until 2 years after the LANL alternative. LANL would have capital costs estimated at $312 M vs. $488 M at SRS. Annual operating costs are estimated to be $30 M at LANL vs.$60 M at SRS. I would like to insert for the record, the draft Stockpile Management Preferred Alternatives Report. The information follows:

DRAFT

Stockpile Management Preferred Alternatives Report

February 1996

In support of the
Stockpile Stewardship and Management
Programmatic Environmental Impact Statement

United States Department of Energy

DRAFT

I. INTRODUCTION

The Stockpile Management program maintains, evaluates, repairs, and dismantles the nuclear weapons stockpile, and provides the capability to manufacture replacement nuclear weapons, if required. The program is conducted at nuclear weapon production facilities owned by the United States government and operated by government contractors. Throughout the 1970's and 1980's, there were seven production facilities located throughout the U. S. Prior to the 1970's, while the large U. S. stockpile was being initially built, there were several additional production facilities, at one time a total of 14, which provided redundant or backup capability should the primary facility be lost. By about 1970 most U. S. nuclear weapons production was focused on manufacturing replacement weapons and dismantling the retired weapons. With the exception of those manufacturing operations which utilized tritium, all redundant or backup capabilities were eliminated at that time. Because tritium has a relatively short radioactive half-life, and therefore a loss of tritium processing capability would rapidly affect stockpile integrity, backup capabilities for tritium operations were retained until the end of the cold war.

With the end of the cold war, actions were begun to reduce the size of the nuclear weapons production complex to size it appropriately for the reduced nuclear weapon stockpile and the reduced national security threat. Plutonium operations for pit production were closed at Rocky Flats Plant, without reestablishing the capability elsewhere, in 1992. In 1994, production operations were ended at three of the seven nuclear weapons production facilities (Mound in Ohio, Pinellas in Florida, and the nonnuclear remainder of Rocky Flats in Colorado). Their production responsibilities were transferred to two of the remaining four plants and to two of the weapon laboratories. Subsequently, studies continued to determine the optimum size and configuration of the nuclear weapons complex. It was recognized that the remaining four production facilities were too large for the expected production work, and that further closure and consolidation or significant downsizing of operations was necessary.

The Department of Energy sought a solution to the size and configuration of its nuclear weapons production capabilities that would accomplish the following objectives

- Fully support the dismantlement of nuclear weapons to the new reduced stockpile levels
- Fully support the surveillance, evaluation, maintenance, and repair of the reduced stockpile
- Provide flexibility to respond to new requirements or to achieve further reductions in the stockpile size
- Maintain, and improve where necessary, the manufacturing technology necessary to fully support the reduced stockpile

- Achieve significant cost reductions to make the cost of operations consistent with a smaller stockpile

- Maintain compliance with all applicable environmental requirements while operating in a safe and environmentally conscious manner

The solution which simultaneously achieves these objectives was not obvious. For a large diverse nuclear weapons stockpile of greater than 20 thousand weapons, as existed during the cold war, it was necessary to have a large dedicated manufacturing complex. At the other extreme, if the U. S. were to support a stockpile of only a few hundred weapons, a small capability collocated with its weapons research and development capability would probably be sufficient. With the reduced stockpile levels planned, it was not clear which operating model applied.

The U. S. began moving selected production operations back to the weapon laboratories with the closure of plants in 1994, in recognition of the need to collocate some research, development, and production operations for support of a smaller stockpile. In 1994, in the Nuclear Posture Review, the DOE was asked to support a future U. S. stockpile of 3500 accountable weapons, i.e. the START II protocol, with the capability to continue to support a larger stockpile of 6000 accountable weapons (the START I Treaty) or to reduce stockpile levels further. (The term "accountable weapons" and its relationship to total stockpile size are discussed in Section II.) Whether these reduced stockpile levels necessitated additional plant closures and consolidation of work into the weapons laboratories, or supported downsizing of operations at the existing plants was not clear. Studies were begun late in 1994 to address this question.

The DOE decided to address production facility downsizing or relocation as part of the Stockpile Stewardship and Management Programmatic Environmental Impact Statement (SSM PEIS). The SSM PEIS process was formally begun with publication of a Notice of Intent in June 1995. A Record of Decision on the SSM PEIS is scheduled for August 1996.

The purpose of this report is to present in a summary form the Stockpile Management alternatives considered in the SSM PEIS and the technical and cost rationale for the selection and identification of a preferred alternative. Though environment, safety, and health impacts of the PEIS alternatives have not been finalized, preliminary impacts have been documented in the draft SSM PEIS that has been developed in parallel with this report. Those preliminary impacts were considered in the development of the preferred alternative to assure the recommended preferred alternative did not represent a significant new environmental impact. None was found. A final decision regarding the alternative to be implemented by DOE will be documented in the Record of Decision of the SSM PEIS. That decision will be made based on the technical, programmatic, and cost information summarized in this report, the environmental, safety, and health analyses presented in the SSM PEIS, and other relevant policy and programmatic information.

A. Alternatives Considered

Two general types of alternatives were considered by DOE: downsizing of existing plants or relocation of the plant functions to a laboratory. The DOE has always retained a relatively small fabrication and assembly capability for unique nuclear weapons production technologies at its design laboratories to support research, development, and test activities. Alternative future configurations for Stockpile Management considered the expansion of these small fabrication and assembly capabilities sufficient to support future production needs. An obvious second alternative for each major mission was to downsize existing production facilities to a size appropriate to the future workload. Alternatives were sought which minimized construction of new facilities. Alternatives which required the establishment of facilities and capabilities where none historically existed were, therefore, considered unreasonable.

The alternatives considered are shown below.

Stockpile Management Alternatives

	Site Alternatives							
Technology	PX	Y-12	KCP	SRS	LANL	SNL	LLNL	NTS
Pit Fabrication				*	*			
Pit Requalification and Reuse	*							*
HE Fabrication	*				*		*	
Secondary and Case Fabrication		*			*		*	
Nonnuclear Component Fabrication			*		*	*	*	
Weapon Assembly and Disassembly	*							*

The DOE closed its plutonium component (pit) manufacturing capability at the Rocky Flats Plant in 1992 without establishing a replacement capability. It is expected that, for the next ten or more years, most, but not all, plutonium pit requirements can be satisfied through the requalification and reuse of existing pits. Therefore, alternatives which provided a full capability, but limited capacity, for pit manufacturing were considered. A capable plutonium research and development facility exists at Los Alamos National Laboratory which has produced pits for the nuclear test program and currently is used to perform pit surveillance. It was considered to be an obvious alternative. In addition, the Savannah River Site in South Carolina has a capable infrastructure for plutonium processing, and was considered a reasonable alternative

High explosive components for nuclear weapon assemblies have been fabricated at the Pantex Plant, though large capable facilities have always existed at LANL and LLNL for the fabrication of high explosive components for their development activities. All three of these capabilities were considered reasonable for future production needs

Nuclear weapon secondaries consist of highly enriched uranium, lithium compounds, and other materials. Historically, most of these materials have been fabricated and assembled at the Oak Ridge, Y-12 Plant. Limited fabrication and processing capabilities for these materials have existed at both Los Alamos National Laboratory (LANL) and Lawrence Livermore National Laboratory (LLNL). The expansion of each of these laboratory capabilities to meet future production requirements was considered as an alternative in addition to the downsizing of Y-12 operations.

For nonnuclear component manufacturing, a large capability exists at the Kansas City Plant, and smaller capabilities exist at each weapon laboratory for the nonnuclear components for which the laboratory has design responsibility. Because most of the products manufactured at the Kansas City Plant are designed by Sandia National Laboratories, most nonnuclear manufacturing would be considered for relocation to Sandia for the laboratory production alternative.

For weapon assembly and disassembly operations, a large modern capability exists at the Pantex Plant near Amarillo, Texas. A relatively small weapon assembly capability exists to support the nuclear test program at the Nevada Test Site. Options for future weapon assembly and disassembly operations were limited to these sites.

The SSM PEIS is also assessing alternative sites for the storage of the strategic reserves of plutonium (in the form of pits) and highly enriched uranium (in the form of secondaries). Plutonium pits and secondaries are considered for potential storage at either of the weapon assembly/disassembly alternative sites. Secondaries are also considered for storage at the Y-12 Plant, should it be the chosen site for secondary and case fabrication. Strategic reserve storage at other candidate sites is also being considered in the DOE Material Storage and Disposition PEIS. A final DOE decision will be made on its storage location after considering the analyses of both PEISs.

The detailed operating data and facility information from the analysis of these siting alternatives are presented in a February 1996 DOE, Albuquerque Operations Office report entitled, *Analysis of Stockpile Management Alternatives.* This report derives data for its conclusions and recommendations from that analysis. The cost and technical justification for the Stockpile Management preferred alternative along with an overview of the schedule for its implementation are presented in subsequent sections of this report.

B. A New Operating Environment

Before describing specific plant-by-plant plans for the conduct of the Stockpile Management program, it is necessary to first describe a new operating environment which will govern future production activities. In the past, DOE was able to sustain critical capabilities in both Stockpile Stewardship and Stockpile Management with an ongoing program of new weapon development and production and with the ability to perform underground nuclear tests as a confirmation tool. These conditions do not exist today; therefore it is essential that positive measures be taken to increase program confidence in the new operating environment. To provide increased confidence that critical technical capabilities are maintained for both Stockpile Stewardship and Stockpile Management, positive measures will be implemented which seek to integrate production and laboratory technical capabilities and interject greater teaming to accomplish program needs.

The DOE is also developing an enhanced surveillance program to increase the ability to predict material and component defects. The present surveillance program has been successful in finding problems through testing, but has not always been successful in anticipating problems. In the past when problems were found, the DOE always had people and facilities which could be redirected from other weapon development or production activities to address the problem. Therefore, maximum warning time of problems was not a program priority. In the future, DOE will not always have ongoing weapons development and production activities from which to redeploy resources for stockpile concerns. Therefore, an enhanced surveillance program focused on providing increased warning time is being developed. Additional teaming and integration of plant and laboratory capabilities are judged to be essential to provide maximum benefit from current surveillance testing and from the new enhanced surveillance program.

Finally, decisions made today relative to the future of dedicated production facilities would need to be revisited should future arms reduction initiatives result in a significantly smaller nuclear weapon stockpile. Therefore, positive measures are necessary today to reduce the technical risk should future stockpile reductions make additional work consolidation necessary. Two specific positive measures are planned which will address these concerns and affect the future operating environment of the weapons production facilities.

1. Explicit responsibility for oversight of the weapon surveillance testing program at production facilities will be assigned to weapon laboratories. Extended weapon lifetime requirements and the associated potential effects on weapon safety, performance, and reliability will increasingly challenge the Stockpile Stewardship program. For this reason, it is judged by DOE to be imperative that a closer linkage between the weapon laboratories and the associated weapon surveillance activities at the production plants be established. Assignment of responsibility to the laboratories for oversight of the surveillance testing activities at the production plants is judged to be an effective means to assure this linkage. The important traditional surveillance role of the production facilities in surveillance testing will continue at about the same level. With the development and implementation of enhanced surveillance testing, overall surveillance activities are expected to increase with some of this increase performed at the responsible weapon laboratory. The intent of this initiative is to establish an integrated surveillance program between the laboratory and production organizations.

2. Explicit responsibility for the assurance of continued competence in weapon production technology will be assigned to the weapon laboratories. Today, competence in production technology resides primarily at the production facilities, though the weapon laboratories have unique expertise for the fabrication of limited quantities of most weapon components. DOE has determined that it is essential in the future to have an integrated technology program between the production facilities and specific weapon laboratories to ensure that critical technologies are maintained, that necessary new technologies can be introduced without adversely affecting weapon safety and performance, and that work is pooled to ensure efficiency. This partnership will insure that a strong production knowledge base is maintained. It is not expected that the amount of production technology work to be performed at the weapon production facilities will change significantly as a result of this initiative, though it is expected that a robust integrated technology program will exist at the weapon laboratories to complement the work at the individual production plants. The DOE expects that the laboratories, with laboratory employees, may conduct technology work at the production facility, and conversely that production employees may be assigned to work at the laboratories. The objective is to ensure a forward-thinking team program which is jointly conducted under laboratory leadership.

The following sections describe the DOE Stockpile Management preferred alternative and provide summary descriptions of the proposed actions at each laboratory and production facility. Data and other supporting rationale are provided to justify DOE recommendations relative to each facility.

In addition, although tritium recycle operations are covered in the recently completed PEIS associated with tritium production and recycle, the tritium recycle operations are an integral part of the weapons production complex. Therefore, for completeness, DOE plans for downsizing tritium recycle capabilities at the Savannah River Site, in line with future workload requirements, are also included in this integrated program description.

II. CAPACITY REQUIREMENTS

The production complex capacity requirements for the smaller nuclear weapons stockpile are based on the need to support the reliability and safety of weapons in the enduring stockpile of 2004 and beyond The deterrent role of nuclear weapons has been a key element of U. S. national security policy for decades In July 1994, President Clinton reemphasized this national security strategy by saying,

> "We will retain strategic nuclear forces sufficient to deter any future hostile foreign leadership with access to strategic nuclear forces from acting against our vital interests

> and to convince it that seeking a nuclear advantage would be futile. Therefore, we will continue to maintain nuclear forces of sufficient size and capability to hold at risk a broad range of assets valued by such political and military leaders."

Due to their strategic importance, the numbers and types of nuclear weapons in the United States inventory are carefully established and reviewed annually by the Secretaries of Defense and Energy, and approved by the President.

Nuclear Posture Review

The Nuclear Posture Review (NPR) was a ten month, comprehensive review of nuclear forces and policies led by the Department of Defense (DOD) Joint Chiefs of Staff that looked at doctrine, force structure, operations, safety and security, and arms control. A major conclusion was that while reductions in Russian nuclear forces have allowed great strides to be made in reducing U. S. nuclear forces, the U. S. must continue to be prepared for a potential reversal of trends within Russia. In light of this uncertain future, the NPR recommended that the U. S. maintain its flexibility, a hedge, to reconstitute nuclear forces if required.

The NPR recommended a realignment of nuclear forces. Strategic forces were to be aligned as follows:

- Possess no more than 20 B-2 bombers
- Reduce the B-52 bomber force from 94 to 66 aircraft
- Reduce the Trident submarine force from 18 to 14 submarines and equip all submarines with D-5 missiles
- Maintain up to 500 single warhead Minuteman III ICBMs
- Maintain flexibility to reduce forces further or reconstitute

Nonstrategic forces were to be aligned as follows:

- Maintain European commitment at current level
- Eliminate nuclear weapons capability from U. S. Navy surface ships
- Retain nuclear cruise missile capability on submarines
- Retain land-based dual-capable nuclear aircraft capability

In addition, the NPR recommended downward flexibility in the size of nuclear forces should faster and deeper arms reductions be negotiated--the lead option. Positive measures were to be established to allow a flexible response to achieve a smaller U. S. stockpile.

The President endorsed the recommendations of the NPR in September 1994, and indicated clearly that nuclear weapons would remain part of the post Cold War U. S. national security environment.

In addition, the NPR had specific recommendations for DOE in terms of Stockpile Stewardship and Management requirements. These requirements are summarized below:

- Maintain nuclear weapon capability (without underground nuclear testing or fissile material production)
- Develop stockpile surveillance engineering base
- Demonstrate capability to refabricate and certify weapon types in the enduring stockpile
- Maintain capability to design, fabricate, and certify new warheads
- Maintain science and technology base
- Ensure tritium availability
- No new-design nuclear warhead production

The NPR specifically left open future options for decreasing or increasing the size of the weapons stockpile in response to changing international environments.

Production Workload Assumptions

For purposes of assessing alternative configurations for the Stockpile Management program, the strategy of the NPR was used, i.e. a START II-sized stockpile while retaining both a lead and a hedge capability. The Stockpile Management stockpile composition for 2004 and beyond was based on the 1995 Draft Nuclear Weapons Stockpile Memorandum (A review of the draft 1996 NWSM indicates no significant changes which would affect the conclusions of this analysis). The considerations for developing a production workload based on the assumed stockpile level include national security policy, historical stockpile defect and change data, and the quantities and types of weapons in the future stockpile. The assumed Stockpile Management workload was prepared by representatives of DOE, the three weapons laboratories, and the four production plants based on the draft Nuclear Weapons Stockpile Memorandum. Assistance was provided by a representative from the Office of the Assistant to the Secretary of Defense for Atomic Energy (ATSD (AE)).

The DOE approach for supporting the stockpile consists of three essential parts.

- Repair defects as required to maintain safety and reliability requirements Defects are identified through surveillance testing activities and the inspection of weapons during routine maintenance.

- Requalify components for use in the stockpile beyond their originally certified design life. Traditionally, weapon systems were replaced with new systems for reasons other than age before they reached their certified lifetime.

- Replace components, or complete weapons, on a scheduled replacement interval to prevent component failure from adversely affecting the availability, reliability, safety or security of weapons in the future stockpile. Weapon surveillance programs are relied upon to provide adequate warning time for a timely response.

The above workload strategy was used for evaluating site alternatives for the Stockpile Management activities to support the SSM PEIS. In addition to this "base case" workload, alternative stockpile size workloads were analyzed. These alternative stockpile size workloads (a low case lead option and a high case hedge option) were used for determining the sensitivity of the analysis to a higher or lower stockpile size, and to assist in making decisions for future production capacity. The high case corresponds to the START I accountable warhead stockpile. No specific DOD force structure projection corresponds to the low case hypothetical stockpile. However, stockpile sizes in this range have been proposed by others (See for example *Foreign Affairs*, Spring 1993). The assumed production capacities associated with each stockpile level are summarized in the following table.

Alternative Stockpile Size Production Capacity Assumptions

	Low Case	Base Case	High Case
Stockpile Size Criteria	< START II	START II	START I
Strategic Stockpile Size (Accountable Warheads)	1,000	3,500	6,000
Weapon Disassembly Capacity			
Weapon refurbishment	50	150	300
Surveillance testing	120	120	140
Disassembly Total	170	270	440
Weapon Assembly Capacity			
Weapon refurbishment rebuilds	50	150	300
Surveillance testing rebuilds	110	110	140
Assembly Total	160	260`	440
High Explosive Components	50	150	300
Nonnuclear Components			
Factory and Field Retrofits	up to 100	up to 300	up to 600
Replacement Nuclear Components			
Pits	50*	50*	50*
Secondaries	50*	50*	100(200)**

* The facilities and equipment required to manufacture one component for any stockpile system provides an inherent capacity of up to 50 units per year. This capacity is sometime called Capability Based Capacity.

** Operational facilities and equipment sized for 100 units per year with capacity for an additional 200 units in cold standby.

Required production capacity for alternative stockpile sizes and assumed reconstitution options is a complex subject. First of all, different production capacities are required for different weapon components due to unique aging characteristics and resulting replacement schedules. In addition, assumptions must be made about the ability to optimize future workload to allow optimal production sizing. Finally, assumptions must be made about the required level of sprint or surge capacity to allow short term higher production rates to fix a stockpile problem.

A more detailed discussion of capacity issues and contingency options associated with each major production mission is given in Section III. In the following sections, facility and transition costs assume facilities sized for the NPR hedge option. Consistent with the NPR, facility operating costs are estimated for an operational level which would support the START II stockpile.

III. JUSTIFICATION FOR PREFERRED ALTERNATIVES

This section presents a description of the recommended preferred alternative for each of the major Stockpile Management production missions. In addition, information that supported the recommendation of the preferred alternative is presented. For each alternative, the Net Present Value of costs for a 25 year period, a numerical measure of the technical risks, and other programmatic considerations are presented. Throughout this report, cost information is presented in fiscal year 1995 constant dollars.

The reader is referred to a companion report entitled *Analysis of Stockpile Management Alternatives*, dated February 1996 for further detail regarding the methodologies for the cost and technical risk determinations. That report also provides a detailed technical description of each alternative, associated costs, comparative technical risks, and other programmatic issues.

A. Pit Mission

1.0 Preferred Alternative for Pit Fabrication

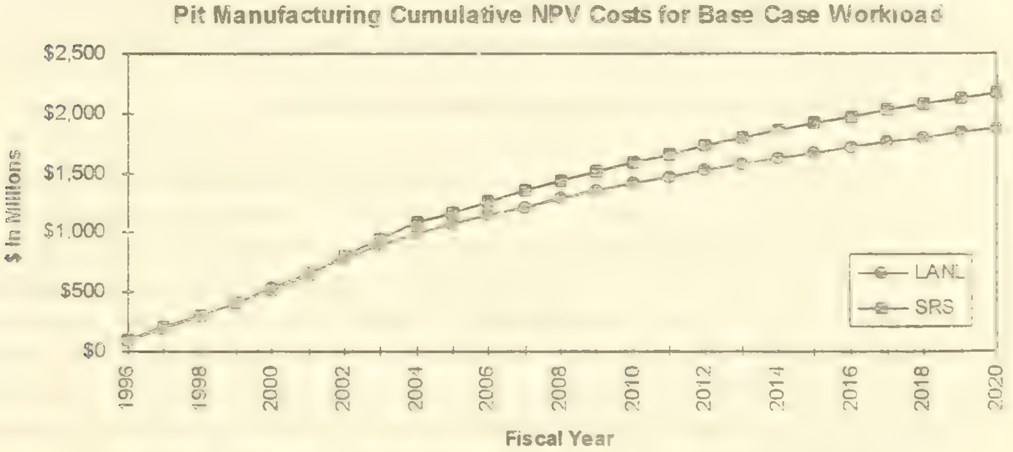
Two sites were considered as alternatives for the pit fabrication mission: (1) Los Alamos National Laboratory (LANL) which has an active program involving both fabrication and recovery of plutonium and has fabricated pits for nuclear explosive testing, and (2) Savannah River Site (SRS) which has separated and produced plutonium metal from reactor targets and has recovered plutonium from scrap materials. For reasons of cost and technical risk,

The recommended preferred alternative is to assign the pit production mission to Los Alamos National Laboratory.

1.1 Net Present Value Costs

Net Present Value (NPV) costs for each alternative are shown below. The costs consisted of (1) capital investment, (2) the cost of steady-state operations, and (3) the cost of the ongoing pit evaluation and research and development program at LANL.

With the cessation of plutonium production operations at Rocky Flats in 1992, the DOE did not immediately reestablish its capability to produce significant quantities of pits. Consequently, the costs associated with the pit production alternatives relate to reestablishing this capability, rather than consolidating or downsizing an existing capability, as is the case with the other production missions. As the following figure indicates, LANL is the lower cost alternative. In addition, the LANL capability could be in place and operational by 2004, two years earlier than the SRS option



1.2 Technical Risks

Technical risk associated with each alternative was assessed by comparing the relative experience of each site in the pertinent areas of basic production and production support infrastructure. No pits are currently being produced for the nuclear weapon stockpile, and neither site has done so in the recent past. As noted above, LANL has recently provided pits for nuclear explosive testing, and is currently producing plutonium-238 heat sources for NASA programs. Also, LANL continues to perform pit surveillance and technology development activities directly related to the required capabilities for pit fabrication.

SRS is currently processing and shipping plutonium-238 to LANL to support fabrication of heat sources. Although SRS has an excellent plutonium health, safety, and safeguards infrastructure, the historical mission for the site has been separation and production of plutonium metal for shipment to other sites for weapon programs use. Consequently, SRS has no experience with the kind of capabilities required for precision nuclear component manufacturing and the ancillary supporting functions such as tool and product engineering, precision machining, and nondestructive evaluation.

The following table provides the numeric ranking for the two measures of technical risk and the numeric measure of relative cost. These ranking criteria and associated rating system are used for each major production mission in this report. The reader is referred to the report *Analysis of Stockpile Management Alternatives* (February 1996) for a full description of the criteria and rating system. That report also provides a detailed analysis of each alternative with sufficient technical and cost information to justify the rating.

Ranking Criteria	Score	
	LANL	SRS
Basic Production Capability	90	70
Capability of Production Infrastructure	92	50
Minimize Cost	100	86

1.3 Capacity Assumptions and Contingency Options

The planned workload for the fabrication of new replacement pits is small for the low, base, and high case stockpiles. Only replacement of pits destroyed in routine surveillance testing is expected until a near term life limiting phenomenon is observed in stockpile pits. Most pit requirements during weapon refurbishment are expected to be satisfied by requalification and reuse of existing pits. Historical pit surveillance data and pit life studies do not predict a near term problem. However, data is limited for weapons older than 25 years and for the youngest weapons in the enduring stockpile. Therefore, the technological capability to fabricate replacement pits for enduring stockpile weapons must be reestablished, albeit with a small capacity.

The technological capability to manufacture all plutonium pits in the weapons stockpile provides an inherent capacity to manufacture about 50 pits per year in single shift operations. A larger single shift production capacity of 100 pits per year was also studied as part of the stockpile sensitivity analysis. This larger capacity could be added at a relatively modest additional cost ($44 million at LANL or $20 million at SRS). However, during weapon refurbishment to replace other components, most pits are expected to be requalified and reused. In addition, about 20 pits per year are expected to be required to replace pits destroyed in routine surveillance testing. A capacity of about 50 pits per year is, therefore, judged to be sufficient for the next 10 or more years for any of the assumed stockpile levels.

In sizing the plutonium fabrication capability for the future nuclear weapons program, consideration was given to establishing a larger fabrication capacity in line with the capacity planned for other portions of the nuclear weapon complex Larger capacity was rejected, however, because of the small demand for the fabrication of replacement pits, and the significant, but currently undefined, time period before significant additional pit production capacity would be needed.

Construction and operation of a larger pit production capacity at this time would be expensive, and would not have sufficient workload for the foreseeable future to justify its maintenance and operation. In addition, a new larger plutonium fabrication facility would by necessity be based on manufacturing facilities at Rocky Flats. Advances have been made in process technology since the construction of Rocky Flats, however significant technological advances have not been made in facility design, layout, and operation.

DOE believes that improvements are possible in facility design, construction, and operations which would significantly affect new plutonium facility size, cost, and environmental impact. DOE further believes that development and demonstration work should be performed on alternative facility concepts prior to making large financial and programmatic commitments, particularly in light of the small near term requirement for pit production. Significant time exists before a larger plutonium fabrication facility could be required. This time should be used to develop and demonstrate alternative concepts to help guide future decision makers regarding plutonium facility design and construction.

For these reasons, this programmatic analysis limits plutonium fabrication facility analysis to a facility sized to meet expected programmatic requirements over the next ten or more years. It is not sized to have sufficient capacity to remanufacture new plutonium pits in a time frame commensurate with the time period of their original manufacture. DOE will perform development and demonstration work at its operating plutonium facilities over the next five years to study alternative facility concepts which could be utilized in the future in the construction of a larger fabrication capacity. Environmental analysis of this larger capacity is not planned at this time because of the uncertainty in the need for such a capacity and the uncertainty in the facility technology that would be utilized. Should a larger pit production capacity be required in the future, appropriate environmental and siting analysis would be performed at that time. Existing DOE plutonium facilities, such as those at SRS, would be the expected candidates for siting of this larger capacity.

1.4 Other Considerations

The SRS alternative proposes to utilize facilities that currently are free of plutonium contamination, whereas the proposed option for LANL is currently in full operation as a qualified Class I plutonium facility. Assignment of the pit fabrication mission to SRS would increase the future cost of decontamination and decommissioning of plutonium facilities. This cost was neither analyzed nor included in the estimates.

The SRS alternative is less constrained by space limitations than the LANL alternative, and consequently has a larger ultimate capacity.

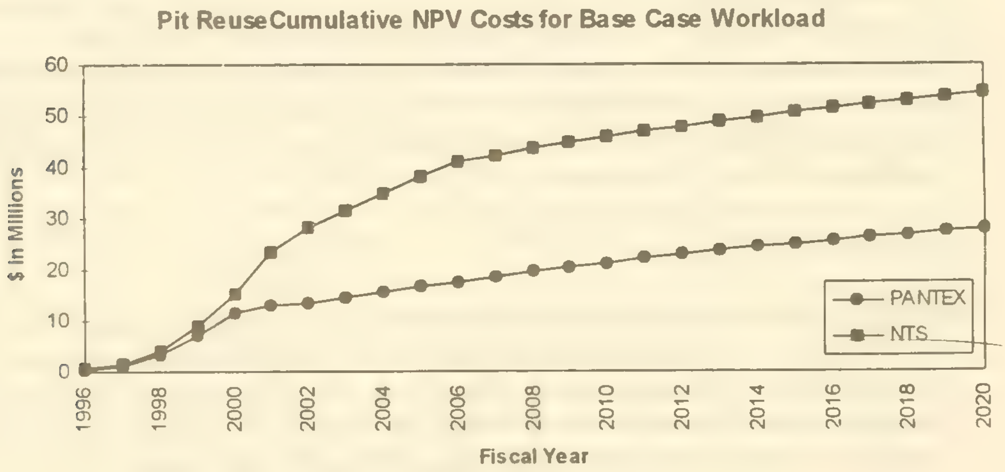
2.0 Requalification of Intact Pits and Nonintrusive Pit Modification Reuse

Two sites were considered as reasonable alternatives for requalification of intact pits and nonintrusive pit modification reuse: (1) the Nevada Test Site (NTS) which historically has provided the support for nuclear explosive testing by the weapons laboratories, and (2) the Pantex Plant which currently performs all assembly/disassembly functions including pit recertification. Either site would only be assigned this mission if they were assigned the weapon assembly/disassembly mission. Because these operations would not involve work with uncased plutonium, they could be performed in specially equipped bays at Pantex or at the Device Assembly Facility (DAF) at the NTS. Capability to perform requalification and reuse of pits would inherently also provide capability for requalification of secondaries, should that capability be needed. A qualified Class I plutonium facility would not be needed. For reasons of cost and technical risk,

The recommended preferred alternative is to assign the pit requalification and reuse production mission to the Pantex Plant.

2.1 Net Present Value Costs

A net present value (NPV) cost analysis was performed to assess the merits of the two siting options. The costs consisted of (1) capital investment to install a capability for pit reuse and (2) cost of steady-state operations. In addition, an analysis was performed of the cost to install and operate a capacity for both higher and lower levels of workloads to judge the relative sensitivity of the two site alternatives to workload changes. As the following figure indicates, assigning this mission to Pantex is the lower cost alternative.



2.2 Technical Risks

Technical risk associated with each alternative was assessed by comparing the relative experience of each site in the pertinent areas of basic production and production support infrastructure. The pit reuse and pit requalification requirements are being developed, consequently neither site has experience in all operations. However, Pantex has supported LLNL in developing one type of pit reuse workstation and is familiar with its design and function. In addition, Pantex has routinely performed gas analysis and limited pit diagnostics as part of its weapons surveillance mission. Although the NTS has supported work involving assembly of pits into nuclear explosive devices, these operations were performed by weapon laboratory personnel, consequently there is no experience at the NTS associated with pit modification and inspection operations. Consequently, DOE judges Pantex to be the lower technical risk.

The following table provides the numeric ranking for the two measures of technical risk and the numeric measure of relative cost.

Ranking Criteria	Score	
	NTS	Pantex Plant
Basic Production Capability	50	85
Capability of Production Infrastructure	50	100
Minimize Cost	51	100

2.3 Capacity Assumptions and Contingency Options

A basic capability for pit requalification and reuse provides sufficient operating capacity to support the low case or the base case stockpile levels (up to about 150 units per year). This capacity could be doubled for the high case stockpile by operation of a fourth weapon assembly bay at an additional cost of about $6 million per year.

2.4 Other Considerations

As described in Section III. E., the Pantex Plant is the recommended preferred alternative for the weapons assembly/disassembly mission. The DOE desire to collocate pit reuse/requalification with weapons assembly contributes to the selection of Pantex for this mission.

The NTS does not have existing facilities in which to house the pit modification and inspection operations. Consequently, a construction project would be required to build an addition to the DAF for these operations. This project cost was included in the analysis.

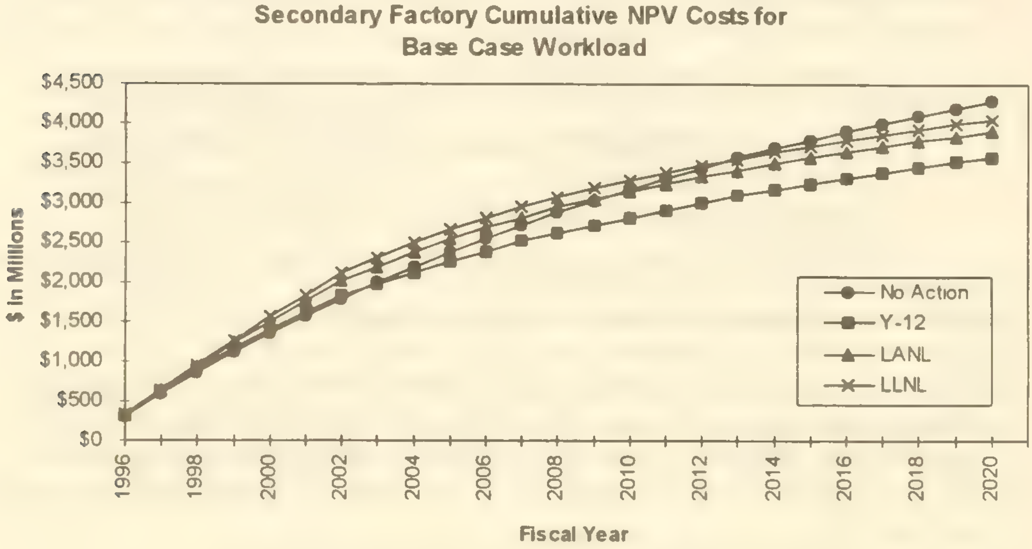
B. Secondary Factory Mission

1. Preferred Alternative for Secondary Fabrication

Three alternative sites were considered for the future secondary factory: the Y-12 Plant, LANL, and LLNL. In addition, a no action alternative (at Y-12) was considered for comparative purposes. For reasons of cost, technical risk, and additional capacity flexibility, *The recommended preferred alternative is to retain the secondary production mission at the Oak Ridge Y-12 Plant.*

2. Net Present Value Costs

The cost analysis determined the net present value (NPV) for investment and operating costs for a 25 year period. The results of this analysis are shown below.



The highest net present value of costs is associated with the status quo of not downsizing the Y-12 Plant. The alternatives which would transfer production responsibility to either of the two weapon laboratories are lower cost than no action, but are more expensive than downsizing the Y-12 Plant due to their large investment and other transition costs.

3. Technical Risks

Technical risks associated with each alternative site were assessed by rating each alternative in the areas of basic production capabilities and the production infrastructure capability. The results of the technical risk assessment are shown below.

Ranking Criteria	Score		
	Y-12	LANL	LLNL
Basic Production Capability	98	87	88
Capability of Production Infrastructure	100	80	78
Minimize Cost	100	94	88

4. Capacity Assumptions and Contingency Options

As with plutonium pit production workload, the projected workload for secondary fabrication, after near term planned work is accomplished, is projected to be mainly that associated with the replacement of secondaries destroyed during routine surveillance testing. However, unlike pits, secondaries contain organic compounds which can deteriorate with age. The capability to fabricate all secondary and case parts provides an inherent capacity to produce up to 50 sets of weapon components per year. This capacity is sufficient for either the low case or the base case stockpile levels. For the high case stockpile, a factory with a single shift capacity of 100 units per year was assessed. The added investment cost for the higher capacity ranged from $5 million at LANL or Y-12 to $70 million at LLNL. Because of this relatively small required investment for a relatively large contingency capacity, an operational single shift capacity of 100 secondaries per year is assumed to be maintained. At Y-12, an added single shift capacity of 200 secondaries per year can be maintained in a standby mode at minimal cost. This option adds to the attractiveness of the Y-12 alternative. Multiple shift operations would add to these capacity levels.

C. High Explosives Mission

1. Preferred Alternative for High Explosive Production

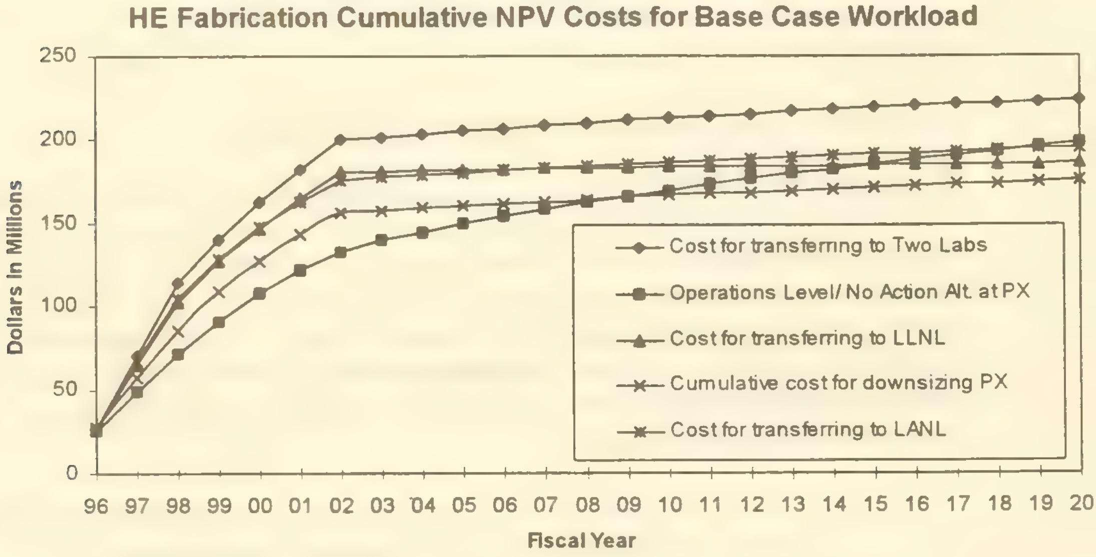
The High Explosives (HE) production mission includes HE procurement, formulation, component fabrication, characterization, surveillance, disposal, and storage. Three sites were considered for the HE production mission: to transfer the work to Los Alamos National Laboratory (LANL) and/or Lawrence Livermore Laboratory (LLNL), or to retain the mission at a downsized Pantex. These three sites have fully capable existing HE capabilities. DOE seeks to assure core competency maintenance while achieving cost efficiencies. The alternative which best achieves these objectives is not clear at this time, therefore,

DOE has deferred identification of a preferred alternative for the high explosives production mission while further analyses are performed.

As discussed in the following sections, this assignment will not be made solely on the basis of cost. The costs for HE production are relatively small for all alternatives, though the joint assignment to the two laboratories is more expensive than assignment to any of the three sites alone. However, the two-laboratory alternative best preserves DOE core competency in high explosives, a critical stockpile stewardship capability. Sections IV and V describe the technical, cost, and schedule implications for LANL and LLNL assuming they have been jointly assigned the HE production mission. Section VIII provides corresponding information assuming the mission has been assigned to a downsized Pantex. A preferred alternative determination between these two alternatives will be made prior to publication of the final SSM PEIS.

2. Net Present Value Costs

Net Present Value (NPV) costs comprised of one-time transition costs and additional annual operating costs are shown below. Pantex costs assume a base mission to perform weapon assembly and disassembly with the high explosives costs incremental to this base mission. Likewise the LANL and LLNL annual operating costs assume a base program to accomplish weapons research and development. Because of the important contribution that HE fabrication capability provides to Stockpile Stewardship competence at the nuclear weapon laboratories, an alternative was also considered which would assign production responsibility jointly to both laboratories. After relocation or downsizing of the HE capability, the incremental annual operating costs for all alternatives, including the two-lab alternative, are about the same. The cost difference between alternatives is due to transition costs, i.e. facility shutdown, workforce restructuring, and production requalification. These costs range from a low of about $10 million for the Pantex alternative to about $40 million for the two-lab alternative.



3. Technical Risks

All technologies required for the HE mission have been previously demonstrated at LANL and LLNL. Both have in the recent past produced HE components in numbers greater than and at specifications comparable to those required for future production. No deviations from the current baseline technologies used at Pantex would be required. Approved procedures are in place for transporting HE from the laboratory to the assembly site. Therefore, the technical risk is low for either laboratory.

However, both laboratories require significant effort to establish the production support infrastructure needed to sustain production. This is a limitation that DOE has successfully addressed in the past at the weapon laboratories, however. In addition, LANL is currently establishing a production infrastructure for the manufacture of detonators and other assigned weapon components, and LLNL has had a limited production infrastructure in place in the recent past.

The technical risk of consolidating at Pantex would be low. Facilities and equipment are modern, well maintained, and capable.

The following table provides the technical risks and relative cost ranking for each alternative.

Ranking Criteria	Score			
	Pantex	LANL	LLNL	Two-Lab
Capability of Process Technologies	100	96	92	94
Capability of Production Support Infrastructure	100	70	65	68
Minimize Cost	100	100	100	77

4. Capacity Assumptions and Contingency Options

Because high explosives contain organic compounds that decompose with age, high explosive replacement is expected to be required for stockpile weapons as they age. This replacement will require the weapon to be returned to the weapon assembly site for refurbishment. The assumed production capacities for HE components for the low case stockpile was 50 sets per year, for the base case was 150 sets per year, and for the high case was 300 sets per year. The transition costs as well as the annual operating costs were found to be relatively insensitive to these alternative capacities Therefore, to assure adequate contingency capacity, single shift production capacity of about 300 component sets per year is planned. LANL and LLNL would each have sufficient capacity within existing facilities to support this production rate. Pantex facilities would be downsized to this lower operating capacity. In addition, as a contingency, DOE could retain some existing high explosive buildings at Pantex in a safe shutdown mode at minimal costs under any alternative. These facilities could be reactivated should future requirements exceed established capacities.

5. Other Considerations

DOE has sought to address the level of expected future production requirements, and whether this level of work is sufficient to maintain competence. This issue is particularly appropriate to high explosive fabrication since DOE has three large existing capabilities (at LLNL, LANL, and Pantex), and the future demand for fabrication for both development and production is very small. Maintaining competence at three separate facilities with a small combined workload challenges DOE in maintaining competence for both Stockpile Management and Stockpile

Stewardship. For example, weapon stockpile reductions with no new weapons production have resulted in a ten fold decrease in expected future high explosive production levels compared to historical production levels at Pantex.

This issue is not unique to DOE. In the past, the Department of Defense (DOD) and other federal agencies bought products and services from DOE high explosive facilities to meet unique program needs. This work could contribute to DOE competency maintenance if it were to continue at historical levels. However, major reductions in requirements for energetic material research, development, test, and production are also occurring at DOD laboratories and at industrial research and development facilities throughout the U.S. This decreasing workload presents a severe challenge to the maintenance of essential capabilities and the retention of critical core competencies in energetic materials research, development, and production.

The DOE sought future weapon complex configurations that simultaneously maintained technical competence, minimized technical risk, and minimized costs. It was recognized that in some cases these would be competing objectives where the minimum risk alternative might not be the minimum cost alternative. In the case of high explosive fabrication, downsizing operations at Pantex or relocation to one of the weapon laboratories would be the low cost alternative. However, concerns about potential loss of competency in high explosives at one or both of the laboratories may make the low cost alternative a higher risk alternative.

Due to all of these considerations, DOE has decided to defer the decision for the preferred alternative for the high explosives mission until further analyses can be performed.

D. Nonnuclear Mission

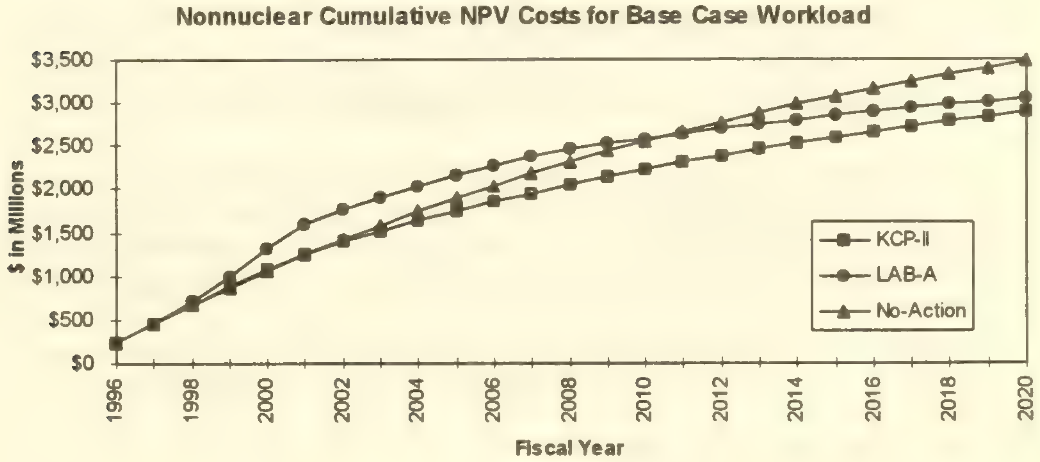
1. Preferred Alternative for Nonnuclear Component Fabrication

There were two alternatives considered for the nonnuclear manufacturing mission as it currently exists at the Kansas City Plant (KCP). One involves downsizing the existing KCP and the other involves transferring the production responsibility to the laboratories which have design responsibility for the products manufactured at KCP (Sandia, LANL, and LLNL). The laboratory alternative had four options (listed in the analysis as Lab A, Lab B, Lab C, and Lab D) to be evaluated. These four options involved various combinations of production assignment to the three laboratories. The reader is referred to the previously referenced *Analysis of Stockpile Management Alternatives* for a detailed description of each laboratory alternative. For reasons of cost and technical risk,

The recommended preferred alternative is to retain the nonnuclear production mission at the Kansas City Plant.

2. Net Present Value Costs

The following chart shows the cumulative cost net present value (NPV) for the downsized KCP and the Lab A (the most cost competitive of the four laboratory options) alternatives. The chart also includes the NPV for the no-action alternative at KCP. Downsizing the KCP has the lowest cost NPV.



3. Technical Risks

The following table provides the technical risks and relative costs rankings for each alternative. The downsized KCP alternative scores best with regard to technical risk. The four laboratory options ranked approximately the same.

Ranking Criteria	Score				
	KCP	Lab A	Lab B	Lab C	Lab D
Basic Production Capability	100	85	84	85	84
Capability of Production Infrastructure	100	74	73	74	73
Minimize Cost	100	95	94	93	92

4. Capacity Assumptions and Contingency Options

The assumed levels for nonnuclear component production were 100 weapon sets per year for the low case stockpile size, 300 sets per year for the base case stockpile, and 600 sets per year for the high case stockpile. These assumed production levels are greater than for most other portions of the weapon because of the historically high levels of necessary replacement of nonnuclear components. For the Kansas City Plant alternative, the cost to downsize the plant is relatively insensitive to the range of potential stockpile sizes because no new construction was required. The Kansas City Plant downsizing costs ranged from $97 million for the low case to $108 million for the high case. In contrast, costs for the laboratory alternatives for nonnuclear production were large and very sensitive to assumed stockpile size. Laboratory construction costs ranged from $200 million for the low case to $290 million for the high case.

It is planned to downsize the Kansas City Plant consistent with the assumed workload for the high case stockpile. This alternative provides maximum flexibility to respond to future larger or smaller stockpile levels at a reasonable cost.

E. Weapons Assembly/Disassembly Mission

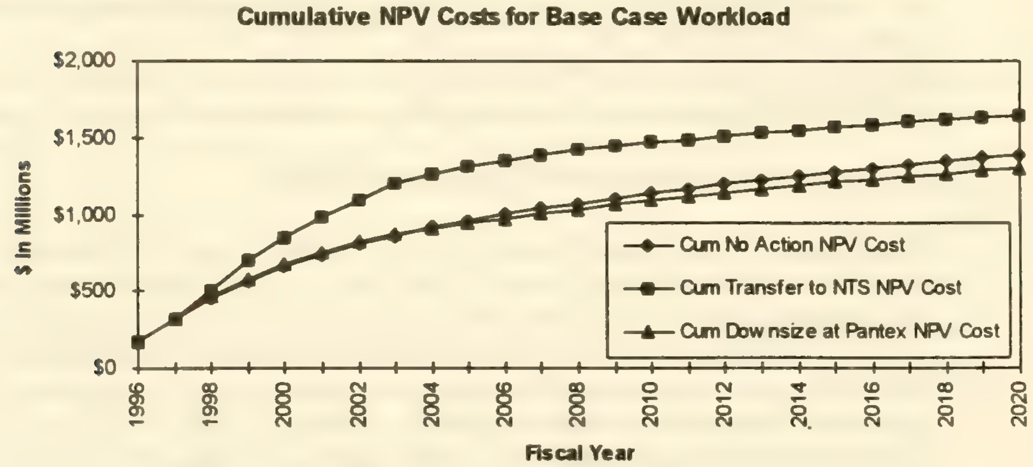
1. Preferred Alternative for Weapons Assembly and Disassembly

Two sites were considered as reasonable alternatives for the assembly/disassembly mission: (1) the Nevada Test Site (NTS) which has been the site for assembly and testing of nuclear test devices and (2) the Pantex Plant which currently performs assembly, disassembly, and surveillance of nuclear weapons. For reasons of cost, technical risk, and program flexibility,

The recommended preferred alternative is to retain the weapons assembly/disassembly mission at the Pantex Plant.

2. Net Present Value Costs

For all workloads, the downsizing of Pantex requires very little investment for construction and transition costs. Alternatively, the relocation of the mission to NTS requires substantial funding in these areas. Coupled with similar annual operating costs for both sites, the NPV analysis indicates that over the twenty-five year life cycle considered, the option to consolidate Pantex results in the better cost alternative. It is also more cost effective than taking no action to downsize Pantex. This is illustrated in the figure below.



3. Technical Risks

Technical risk was assessed by comparing the relative capabilities of each alternative in the areas of basic production capability and production infrastructure. As stated earlier, Pantex is currently performing the A/D mission and consolidation can be accomplished without interruption to operations.

The technologies that would be transferred and established at NTS are identical to those currently at Pantex. Therefore, there would be no technical risk associated with developing new processes; however, there would be minor risk because personnel and processes would need to be relocated and requalified.

The assembly of nuclear test devices was accomplished in the past by personnel from the weapon laboratories, not by personnel from the NTS. Additional risk is, therefore, added to this option due to: the support that would be required from the laboratories to assist in the qualification of the production operations, the uncertainty associated with the availability of laboratory personnel to provide this support, the significant amount of construction required on a very aggressive schedule, and the one year gap in operations. A summary of the relative ranking between the alternative to relocate the mission to NTS and downsize Pantex is shown below.

Ranking Criteria	Score	
	Pantex Plant	NTS
Basic Production Capability	100	80
Capability of Production Infrastructure	100	60
Minimize Cost	100	73

4. Capacity Assumptions and Contingency Options

Annual weapon operations workload was assumed to range from 280 weapons per year for the low case stockpile to 580 weapons per year for the high case stockpile. These weapon operations would include a mix of weapon refurbishments and weapons disassembled and reassembled for surveillance testing. The costs to downsize Pantex would be relatively insensitive to the level of assumed weapon operations (about $15 million for each case). Because of the large construction activity required, the NTS costs were sensitive to the assumed stockpile level. NTS construction costs would range from $215 million for the low case to $313 million for the high case.

It is planned to downsize the Pantex Plant consistent with the assumed workload for the high case stockpile. This alternative provides maximum flexibility to respond to future larger or smaller stockpile levels at a reasonable cost. Depending on the weapon type, additional capacity could be added through multi-shift operations to meet unforeseen program demands. A feature that adds to the attractiveness of Pantex is that for minimal additional cost, some existing facilities at Pantex could be maintained in an inactive mode awaiting D&D. Should future requirements dictate a larger assembly or disassembly capacity (such as might occur in subsequent arms reduction treaties) some of these facilities could be reactivated. This provides the DOE programmatic flexibility that cannot be reasonably attained with the NTS option.

IV. DESCRIPTION OF PROPOSED ACTION FOR LOS ALAMOS NATIONAL LABORATORY (LANL)

1. Description of Proposed Action

Missions

The following Stockpile Management missions would be assigned to LANL:

- Manufacture of pits and intrusive reuse of plutonium components
- Plutonium fabrication and processing technology development with support from LLNL
- Oversight of secondary surveillance testing for LANL-designed weapons
- Oversight of tritium reservoir surveillance, testing, and tritium recycle technology
- Support of high explosive safety and assembly/disassembly operations at the Pantex Plant
- Continuation of previous Stockpile Management assignments (pit surveillance and detonator, beryllium, neutron tube target loading, and pit support component production and surveillance), and
- If selected as the preferred alternative, fabrication of high explosive components for LANL-designed weapons

Operations and Workload

If the high explosives mission is assigned to LANL, the mission would be divided between LANL and LLNL to assure competency maintenance at both laboratories. LANL would fabricate HE components for LANL-designed stockpile systems. Existing capabilities at TA-16 would be utilized. A capacity to support 300 high explosive component sets would be maintained. Actual operations would normally be less than that level.

Plutonium component fabrication capacity of 50 pits per year would be established based on single-shift operations. Technology and capability for all stockpiled weapon systems and alloy types would be supported. Alternative technology would be utilized, if necessary, to support the B83.

The preferred alternative is consistent with the DOE's investment over the last decade in plutonium fabrication and processing facilities and technology at TA-55.

Technological capabilities for the remaining five missions currently exist at LANL.

Facilities

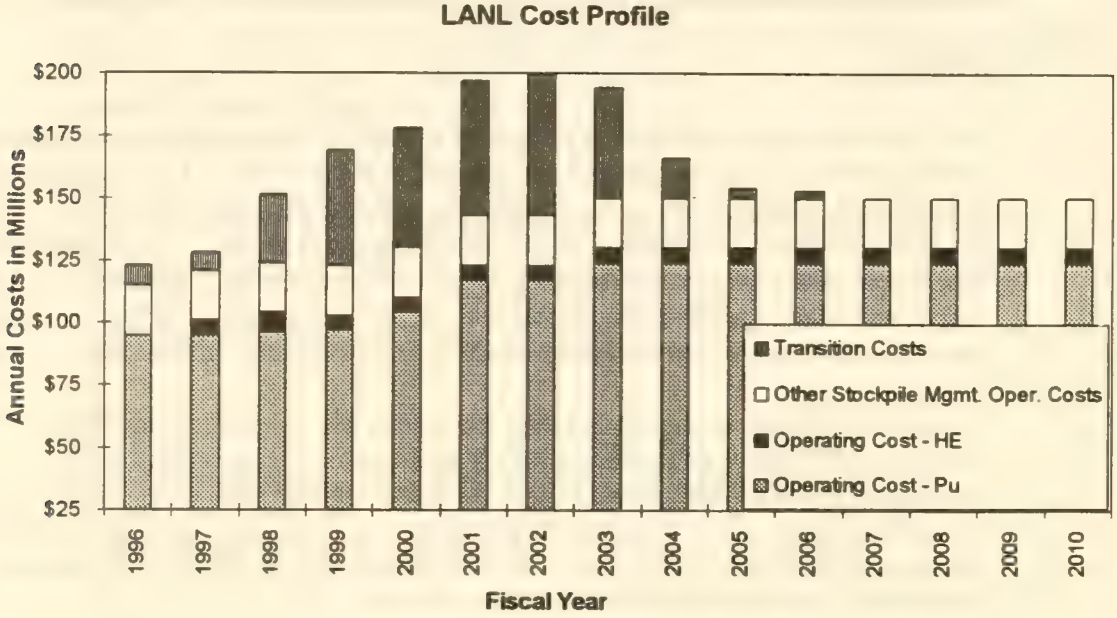
The plutonium missions would be performed at TA-55. This capability would require modifications and new equipment to be installed in the 300 Wing. Concurrently, LANL would complete maintenance upgrades to extend the useful life of the mechanical and electrical systems of the TA-55 plutonium facility. TA-55 has been operational without major refurbishment since 1978 and, though it has been maintained in an excellent condition, there are significant maintenance upgrades that should be made in the next decade irrespective of the pit production mission.

Support of the integrated manufacturing technology and component surveillance mission would require no significant facility upgrades or expansions at LANL. Existing facilities and staff would be utilized in concert with technology and surveillance programs at Savannah River, Pantex, and Y-12 plants to support these missions. Appropriate LANL staff may be located at these plants to work with the plant staff for accomplishment of these joint missions.

2. Costs and Schedules

The annual budgets necessary to establish the new missions and to continue existing missions are depicted below. The transition costs include the costs to relocate missions and to make facility modifications at LANL. Annual operating costs are shown for the plutonium mission and the other Stockpile Management missions that have been assigned to LANL.

In FY 1997 and 1998, there would be a transition cost of about $15 million associated with high explosive component fabrication. There would be no capital investment associated with this transition because existing facilities and equipment at TA-16 could be utilized.

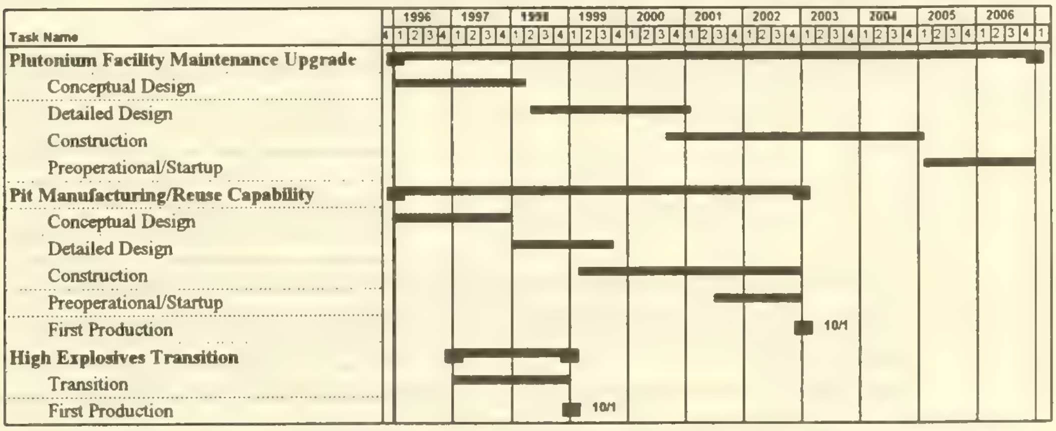


A transition cost of $312 Million supports a combined project to extend the useful life of the electrical and mechanical systems of the TA-55 plutonium facility and to reconfigure one wing for pit manufacturing. Most of the existing pit fabrication equipment has a useful life of an additional 15 years and does not need replacement at this time. In FY 1996 and FY 1997 transition costs are shown for conceptual design to secure project funding in FY 1998. The annual operating cost for the LANL plutonium mission after taking on the pit manufacturing mission will grow from about $95 million to about $125 million

As part of the Nonnuclear Reconfiguration Program, LANL is currently establishing the capabilities to support high power detonators, neutron tube target loading, beryllium technologies, pit support components, etched bridges, and cables. These costs are shown as Other Stockpile Management Operating Costs.

The schedules for establishing the pit and high explosive component (should LANL be selected for this mission) production capabilities are shown below.

LANL Schedule of Activities



3. Risks

The technical risk associated with assigning the pit manufacturing mission to Los Alamos is low because of LANL's:

- Previous history of making pits for nuclear testing
- Experience with technology development for the W88 pit rebuild program
- Experience with the conduct of the pit surveillance program
- Production experience for the Cassini Program
- Plutonium processing support to Rocky Flats Plant production during the 1980's

The risk would also be low in the area of High Explosive component fabrication because of LANL's experience at TA-16 in fabricating high explosive components for explosives development and for nuclear and hydrodynamic testing.

4. Issues and Uncertainties

There is a moderate level of schedule and cost risk because of the high annual funding profile and the aggressive project schedule. An additional risk is the complexity of managing a number of concurrent LANL construction projects in a relatively short time period. The DOE will investigate improved management approaches to ensure project success.

V. DESCRIPTION OF PROPOSED ACTION FOR LAWRENCE LIVERMORE NATIONAL LABORATORY (LLNL)

1. Description of Proposed Action

Missions

The following Stockpile Management missions would be assigned to LLNL:

- Oversight of secondary surveillance testing for LLNL-designed weapons
- Support of high explosive safety and assembly/disassembly operations at the Pantex Plant
- Oversight of uranium and case fabrication and processing technology with support from the Y-12 Plant and LANL
- Continuation of previous Stockpile Management assignments, and
- If selected as the preferred alternative, fabrication of high explosive components for LLNL-designed weapons

Operations and Workload

If the high explosives mission is assigned to LLNL, the mission would be divided between LANL and LLNL. LLNL would maintain the capabilities to support the weapon systems of their design. About $3 million of capital improvements and upgrades would be needed at LLNL Site 300. One-time transition costs at LLNL would be $20.0 million.

LLNL would participate with LANL in the support of HE safety and the assembly/disassembly operations at Pantex.

LLNL would be responsible to coordinate an integrated secondary and case technology development program with Y-12 and LANL to assure capable production processes remain available at Y-12. The secondary and case technology program would be integrated with production technology work at Y-12. This integration of work would seek to provide added assurance that critical manufacturing technology will be retained and that new production technologies can be introduced without adversely affecting weapon safety or performance. The amount of production technology work at Y-12 is not expected to change significantly from current levels; however, the nature of the work will be more aligned with LLNL and LANL Stockpile Stewardship needs. LLNL and LANL employees may conduct some technology work at Y-12 and conversely Y-12 employees may conduct some technology work at the laboratories.

Design laboratory (LANL and LLNL) responsibilities in determining aging effects on secondaries would also become more integrated with surveillance activities at Y-12.

Each organization possesses unique knowledge and skills that would be pooled for greatest efficiency of surveillance operations and greater confidence in predicting aging effects. This could result in laboratory employees actively participating in the surveillance testing and evaluation at Y-12 and Y-12 employees performing surveillance and aging work at the laboratories.

Facilities

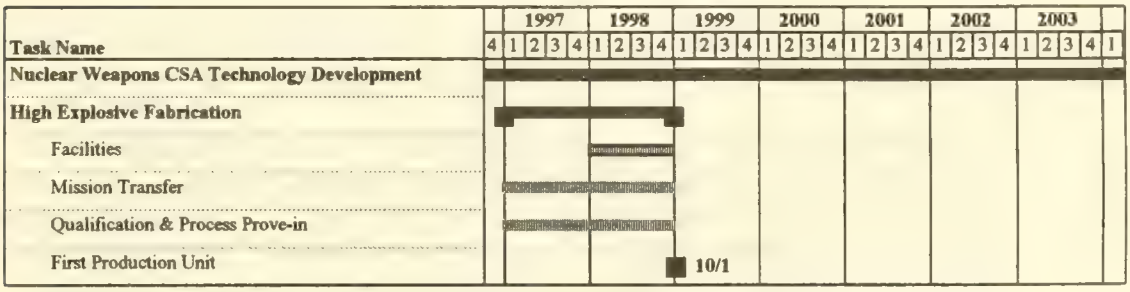
If assigned the HE fabrication mission, existing capabilities at Site 300 and at the High Explosives Application Facility (HEAF) would be utilized. A capacity to support 300 high explosive component sets would be maintained. Actual operations would normally be less than that level. LLNL can provide necessary HE production capabilities with minor modifications to existing facilities at Site 300 and the HEAF at the main site.

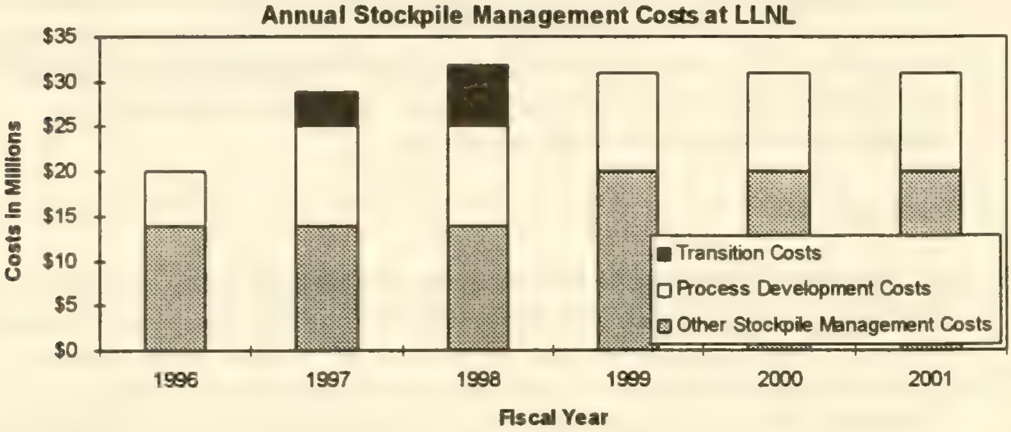
No new facilities are expected to be added at LLNL to accommodate the technology development activities for nuclear weapon secondaries.

2. Costs and Schedules

Schedules and Stockpile Management costs for LLNL are shown in the following charts.

Schedule for Stockpile Management Actions at LLNL





Transition costs are the costs to transfer HE fabrication responsibility from Pantex to LLNL. Process Development costs are an estimate of the costs for LLNL to assume a leadership role in manufacturing technology associated with weapon secondaries and cases. Other Stockpile Management costs represent an estimate of ongoing costs for specific Stockpile Management projects (currently about $15 million per year) and the costs of performing HE production. Additional costs, not shown though not expected to be large, will be required for support of Pantex assembly/disassembly operations and to support plutonium technology work at LANL.

3. Risks

The risk of transferring HE production responsibility to LLNL would be low because of the extensive facilities, experienced personnel, and existing R&D capabilities.

Transportation of high explosives parts with classified shapes to the assembly/ disassembly plant would be performed by existing qualified commercial carriers that meet DOE safeguards and security criteria, and also meet DOT requirements for safe packaging and shipment of HE components. Programmatically, this transportation risk would be small because existing approved methods would be used. The risk to employees and the public from HE transportation is assessed in the SSM PEIS.

4. Issues and Uncertainties

There are no outstanding issues or uncertainties at LLNL associated with HE production, the technology development activities for nuclear weapon secondaries, or other assignments.

VI. DESCRIPTION OF PROPOSED ACTION FOR SANDIA NATIONAL LABORATORIES (SNL)

1. Description of Proposed Action

Missions

Sandia National Laboratories will retain currently assigned Stockpile Management missions including:

- System and stockpile engineering support for non-nuclear components and subsystems
- Continuation of previous Stockpile Management production assignments (principally neutron generators)
- Integration of the stockpile surveillance and reliability assessment programs
- Support of assembly/disassembly operations at the Pantex Plant
- Non-nuclear manufacturing technologies, with support from the Kansas City Plant, LANL, and LLNL
- Independent assessment of nuclear explosive safety
- Quality assessment and maintenance of Primary Standards for the nuclear weapons program
- Military liaison activities including training, technical manuals, and field engineering support

Operations and Workload

Operations will remain essentially constant with nearly the same level and type of support provided to the mission areas as in the past. Facilities and processes will be developed to support emerging nonnuclear manufacturing technologies with support from sites which have nonnuclear manufacturing missions. The total work load at Sandia will remain essentially constant.

2. Costs

Funding is expected to increase slightly from the FY 96 level of $164 million as shown below. This increase is due to the phase in of operations for production missions (primarily neutron generator production) assigned to Sandia in previous decisions. Manpower levels remain relatively constant during this time period.

FY 96	FY 97	FY 98	FY 99	FY 00
$164 M	$177 M	$180 M	$180 M	$180 M

VII. DESCRIPTION OF PROPOSED ACTION FOR KANSAS CITY PLANT (KCP)

1. Description of Proposed Action

Missions

It is DOE's preferred alternative to retain existing nonnuclear production missions at the Kansas City Plant (KCP) and to downsize it appropriately to satisfy future production needs. This optimization of the plant size would result in the least technical risk and greatest cost savings for nonnuclear manufacturing. At the same time, it is DOE's intent that SNL take a greater role and responsibility at the KCP for both nonnuclear manufacturing technology and the conduct of the weapon surveillance testing program.

Operations and Workload

The production mission of the KCP would remain unchanged. The proposed actions to downsize the KCP are driven by the lower production workload for support of the planned stockpile. Manufacturing processes and capabilities will be maintained consistent with production requirements and expected industry capabilities. KCP will continue to procure from industrial sources rather than to maintain in-house capabilities where feasible.

The preferred alternative is also consistent with the initiative started in 1993 to make KCP the Logistics and Manufacturing Center (LMC) for the DOE Weapons Complex. The LMC initiative gave the KCP a greater responsibility for nuclear weapons logistic activities.

The responsibilities assigned to SNL at the KCP will require the establishment of an integrated surveillance testing and assessment program between SNL and the KCP which takes maximum advantage of the expertise of both locations. The assignment of a nonnuclear manufacturing technology role to SNL should help assure continued competence in nonnuclear production technology at both KCP and SNL.

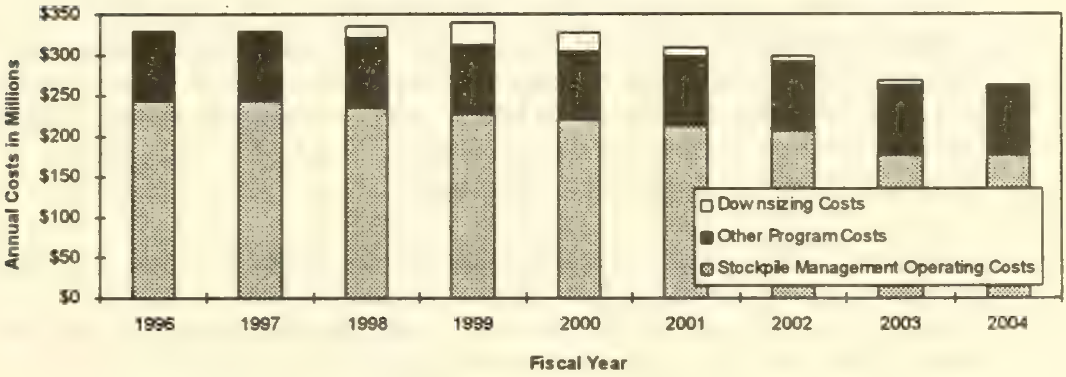
Facilities

Currently, the Kansas City Plant is approximately 3.2 million square feet contained primarily in three connected buildings (main manufacturing, manufacturing support and technology transfer). The manufacturing support building and technology transfer center as well as portions of the main manufacturing building would be vacated. The Kansas City Plant would be downsized to approximately 1.8 million square feet.

2. Costs and Schedules

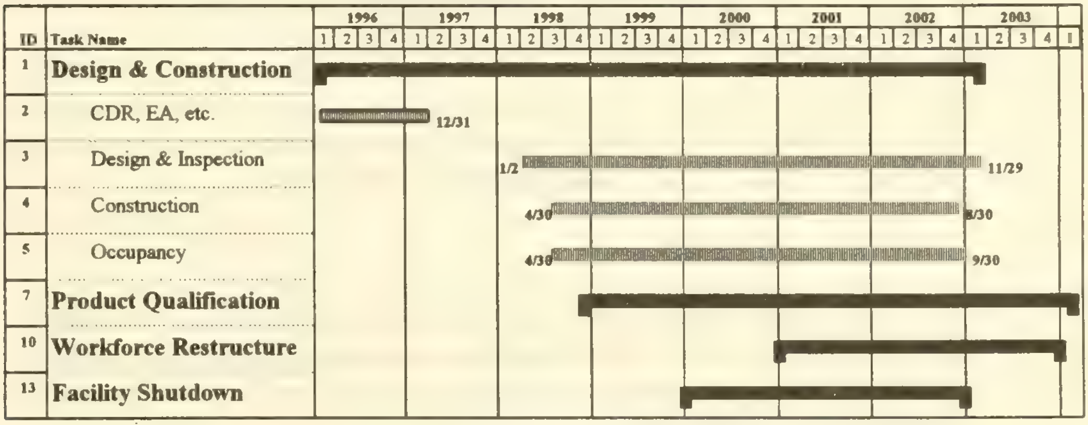
The projected annual budget to downsize and operate the KCP is given below. The cost to transition to the downsized plant is about $90 million. Depending on future actual workload requirements, the annual Stockpile Management operating budget would decrease from the current level of $244 million to as low as $177 million after transition is complete.

Projected Annual Costs for KCP



The schedule for transitioning to the downsized KCP is given below.

KCP Schedule of Activities



3. Risks, Issues, and Uncertainties

The risk associated with downsizing the KCP is extremely low. This is because (1) there is no production program interruption, (2) an experienced work force is retained, (3) a fully capable production infrastructure is already in place, and (4) the existing process and manufacturing engineering expertise are retained.

VIII. DESCRIPTION OF PROPOSED ACTION FOR PANTEX PLANT

1. Description of Proposed Action

Missions

It is DOE's preferred alternative to retain the existing weapon assembly and disassembly missions at the Pantex Plant and to downsize it appropriately to satisfy future production needs. This optimization of the plant size would result in the least technical risk and greatest cost savings. At the same time, it is DOE's intent that LANL, LLNL, and SNL take a greater role and responsibility at Pantex for both weapon assembly technology and the conduct of the weapon surveillance testing program. The responsibilities assigned to LANL, LLNL, and SNL would require the expansion of the laboratories' role at Pantex. A laboratory office jointly staffed by the three laboratories, which is an expansion of the existing Tri-Lab office and the weapons evaluation test laboratory, is expected.

The long-term missions that would be assigned to the Pantex Plant are: (1) assembly/disassembly, surveillance, and dismantlement of nuclear weapons, (2) pit requalification and reuse, and (3) potentially, high explosive component production and storage of the nation's strategic reserves of plutonium (as pits).

The high explosive mission, if it remains at Pantex, would add about $2.25 million in annual operating costs to the levels achieved in downsizing the plant to support the other missions for a smaller future stockpile. Should the mission be transferred to the laboratories, the responsibility would be transferred from Pantex by the end of FY 1998.

Pantex could also be the site for storage of the non-strategic reserves of nuclear materials. These storage missions are currently being assessed in the ongoing Pantex site-wide EIS and the Material Storage and Disposition PEIS.

Operations and Workload

Production processes associated with pit recertification and weapon assembly, disassembly, surveillance, and dismantlement would be identical to those being performed today. The processes needed for pit requalification and reuse would need to be defined and established.

The operational roles of LANL, LLNL, and SNL would change at Pantex. For example, personnel from the laboratories could perform assembly/disassembly for some weapon surveillance operations to improve the programmatic tie between Stockpile Stewardship and Stockpile Management.

As discussed above, the fabrication of high explosives components might be performed at the laboratories. Historically, the fabrication of high explosive parts at Pantex provided the added benefit of a technically knowledgeable high explosive safety capability. If the high explosives mission were transferred to the laboratories, Pantex would continue to be responsible for providing adequate safety capabilities to support the assembly/disassembly mission. However, to compensate and assure no loss of technical high explosive safety expertise, LANL and LLNL could support Pantex with additional expertise at the site to assure an adequate program for high explosive safety.

Facilities

Facilities at Pantex would be sized to support 300 weapon assemblies and disassemblies per year plus the disassembly and reassembly of surveillance weapons. Work would be performed on a single shift. Sprint or surge capacities would come from multiple shift operations.

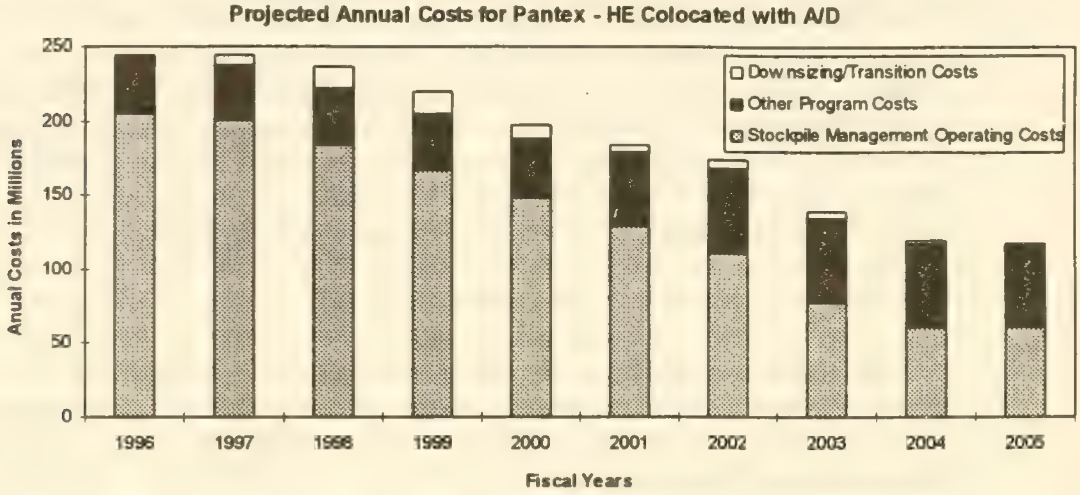
The Pantex missions would be consolidated primarily into Zone 12, with some support activities in Zones 13, 15, and 16. If the storage of excess plutonium were to remain at Pantex, it could continue to be stored in Zone 4. If the high explosive fabrication mission remains at Pantex, it would continue some operations in Zone 11.

Active facilities would consist of about 1.4 million gross square feet. As part of downsizing, there would be modifications and upgrades to some facilities. Facilities not utilized would be put into a standby condition, undergo decontamination and decommissioning, or be made available for economic development. If necessary, the facilities that are in standby condition could be quickly reactivated to provide additional operational capacity of up to several hundred additional weapons per year.

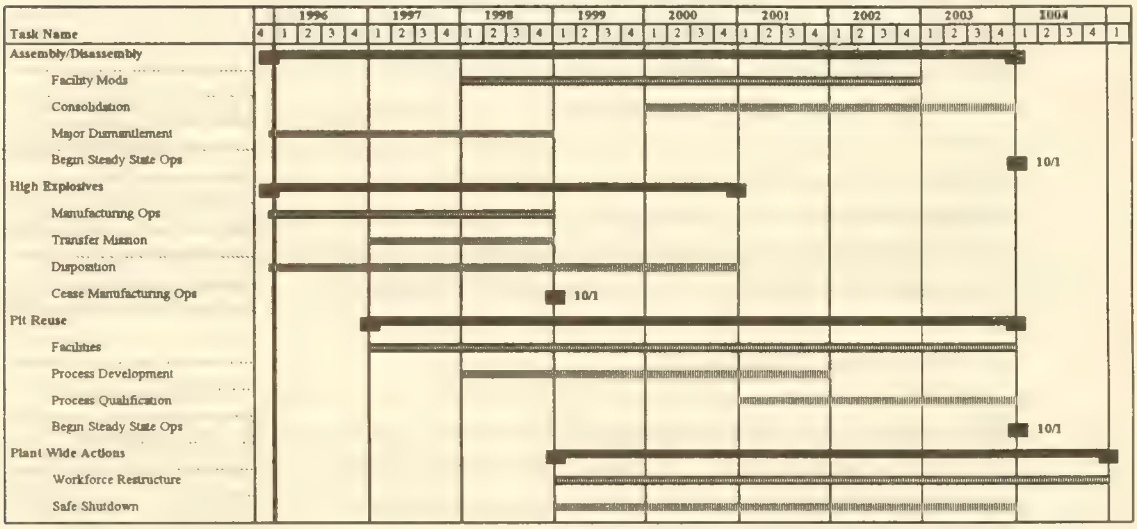
2. Costs and Schedules

The costs, schedules, and manpower projections is shown below. All weapon production facilities except Pantex experienced significant personnel reductions in the past five years due to the end of new weapons production. In contrast, employment at Pantex increased during that time period due to its unique role in weapons dismantlement. That job is expected to be completed in the next few years (per NWSM), however, and commensurate staffing reductions are expected. Most of the reductions in manpower and operating costs are due to the decrease in workload, not the consolidation of the site or the potential transfer of the high explosive mission. Of the total staffing reduction over the next ten years, over 80% will be due to the projected decrease in workload.

Not considered here are personnel and operating costs associated with the storage of excess nuclear material. Programmatic and siting alternatives for the storage of this material are continuing to be assessed as part of the Material Storage and Disposition PEIS



Estimated Implementation Schedules



3. Risks, Issues, and Uncertainties

There is very little risk associated with implementing the downsizing of Pantex. The facility modifications are minor and there would be no interruption in operations

There is no operating experience with pit requalification and reuse. However, the operations are not expected to be significantly different from traditional Pantex processes and equipment, and confidence in the requirements and processes will develop with experience.

A risk that must be addressed is the maintenance of necessary on-site infrastructure for safety and health protection for operations involving high explosives should the HE production responsibility be transferred to LANL and LLNL. High explosive safety expertise must be retained at Pantex to support both weapon assembly operations and the fabrication of HE components. Measures would be taken to assure no loss of capability at Pantex, including an increase in the role of the weapon laboratories at Pantex.

An additional uncertainty is associated with the elimination of projected inventories of high explosives from weapon dismantlement. There is currently no approved schedule for this activity. A completion date of FY 2000 is assumed in this report, and is considered conservative, as it allows for two additional years to complete the disposition of high explosives that would be generated at Pantex through 1998.

IX. DESCRIPTION OF PROPOSED ACTION FOR Y-12 PLANT

1. Description of Proposed Alternative

Missions

It is DOE's preferred alternative to retain existing weapon secondary and case fabrication missions at the Y-12 plant and to downsize it appropriately to satisfy future production needs. This optimization of the plant size would result in the least technical risk and greatest cost savings. At the same time, it is DOE's intent that LLNL and LANL take a greater role and responsibility at Y-12 for both weapon secondary and case technology and the conduct of the weapon surveillance testing program.

The responsibilities assigned to LLNL and LANL would require the expansion of their role at Y-12. A laboratory office at Y-12, jointly staffed by the laboratories, is expected.

The long-term missions that would remain at the Y-12 plant are: (1) fabrication of components for weapon secondaries; (2) assembly/disassembly and surveillance of weapon secondaries and cases; and (3) potentially, storage of the nation's strategic reserves of highly enriched uranium. The Y-12 plant could also be the site for the storage and processing of excess highly enriched uranium.

Operations and Workloads

Operations at Y-12 would be sized consistent with projected workload requirements. Operations would normally be performed on a single shift basis. This level of activity would support the manufacture of about 20 secondaries and cases per year. The secondaries and radiation cases manufactured each year would be used to replace secondaries and radiation cases destroyed by surveillance testing.

Requirements for greater production quantities would require increased production operations staff, multi-shift operations, and/or reactivation of standby facilities. Increasing the production staffing could result in a capacity of about 100 units per year on a sustained basis. Annual workload requirements greater than 100 units could be accommodated by either multi-shift operations, or by reactivation of standby capacity. The reactivation of standby facilities and equipment and the hiring and training of additional production workers would require about three years. The Y-12 production activities would be performed with a small, flexible workforce.

Production process development work at Y-12 would be integrated with the LLNL and LANL secondary technology program. This integration is expected to result in greater assurance that critical manufacturing technology will be retained and that new production technologies can be introduced without adversely affecting weapon safety or performance. The amount of production technology work at Y-12 is not expected to change significantly from current levels; however, the nature of the work will be more aligned with LLNL and LANL Stockpile Stewardship needs. The LLNL employees may conduct some technology work at Y-12, and conversely Y-12 employees may conduct some technology work at LLNL.

Stockpile surveillance activities at Y-12 would also become more integrated with the laboratories. Each organization possesses unique knowledge and skills that will be pooled for greatest efficiency of surveillance operations and for added confidence in the prediction of aging effects. This could result in laboratory employees actively participating in the surveillance testing and evaluation at Y-12, and Y-12 employees contributing to surveillance and aging issues at the laboratories.

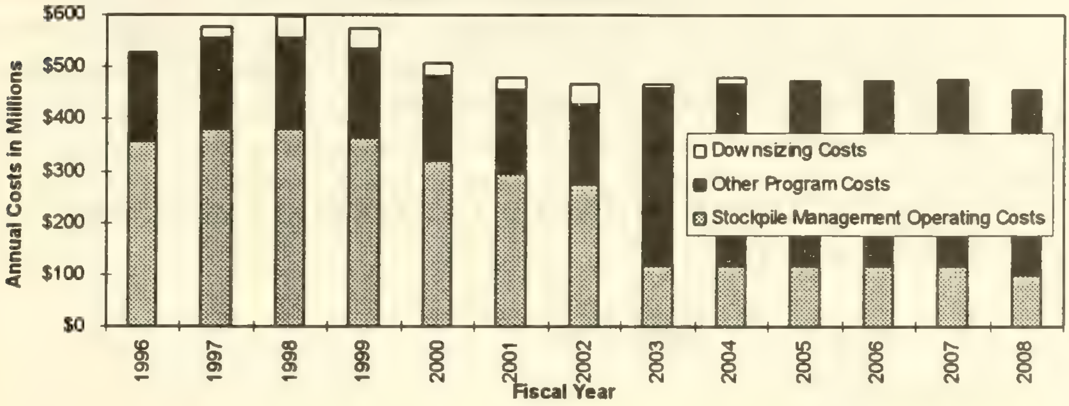
Facilities

Y-12 would downsize and consolidate all secondary and case manufacturing processes into significantly fewer existing production buildings. Existing excess equipment that does not have to be removed to accommodate consolidation would be placed in cold standby. In addition, two production buildings would be maintained in a cold standby status as a contingency. The remaining buildings (80%-to-90% of the current floor space) would be made available to other programs, e.g. the fissile materials disposition program, if Y-12 is chosen for the highly enriched uranium materials disposition mission, or brought to a safe shutdown condition and transferred to Environmental Management for decontamination and decommissioning (D&D).

2. Costs and Schedules

Costs of downsizing and subsequently operating Y-12 are shown below.

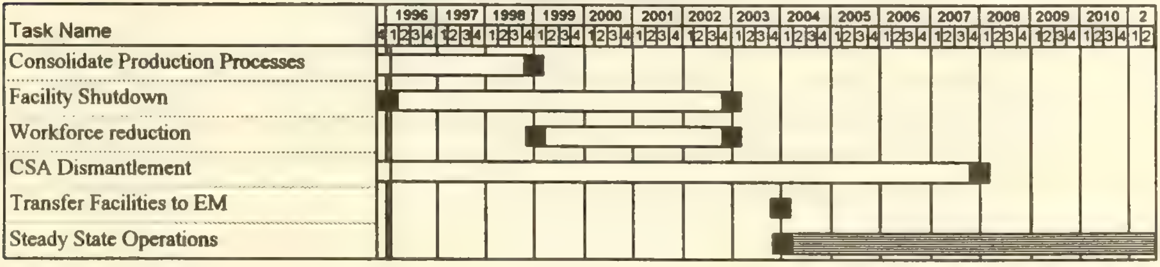
Projected Annual Costs for Y-12



Stockpile Management operating costs are shown to decrease from over $300 million per year to less than $100 million per year by the year 2003. Downsizing costs cover the facility modification, equipment relocation, and other costs to achieve the downsized Y-12. Other program costs include work for other DOE programs and other federal agencies. These costs are assumed to continue at present levels. Not shown are the costs for D&D of facilities determined to be excess to program needs. The landlord costs for excess facilities awaiting D&D are projected to be $131 million annually until the D&D is completed, and are shown as other program costs beginning in year 2003.

The major milestones for downsizing Y-12 are shown below.

Schedule for Downsized Y-12



3. Risks, Issues, and Uncertainties

The planned downsizing of the Y-12 plant involves risk in two areas. The facilities not required for the Stockpile Management program are assumed to be transferred to D&D as the weapons program completes safe shutdown of the facilities. This transfer may not be possible as assumed. Each year of delay in transfer would move $131 million (starting in 2003) from Other Program Costs to the Stockpile Management operating cost in the above funding chart. This issue must be worked well in advance of the time for transfer of the site landlord responsibilities scheduled for 2003.

The second risk is the implementation of the flexible workforce. The consolidated Y-12, operating at the workload described above, would require a production workforce that is capable of operating various production processes, and is therefore subject to bargaining agreements relative to labor classification.

X. DESCRIPTION OF PLANNED ACTION FOR SAVANNAH RIVER SITE (SRS)

1. Description of Proposed Action

Missions

The SRS tritium facilities will continue to support the nuclear weapons stockpile through the recycling of tritium from the weapons stockpile and the loading and surveillance of tritium reservoirs. The SRS would also be the site for tritium production if an accelerator is chosen as the method for tritium production. Tritium production and recycling options have been recently addressed by DOE in a separate PEIS. Tritium recycle plans are presented here for completeness because this activity is an integral portion of the weapons production complex.

A greater role for LANL in tritium recycle technology and tritium reservoir surveillance at SRS is expected. Los Alamos staff could work at SRS in these areas, and conversely it is expected that SRS staff could participate in work at LANL.

Operations and Workloads

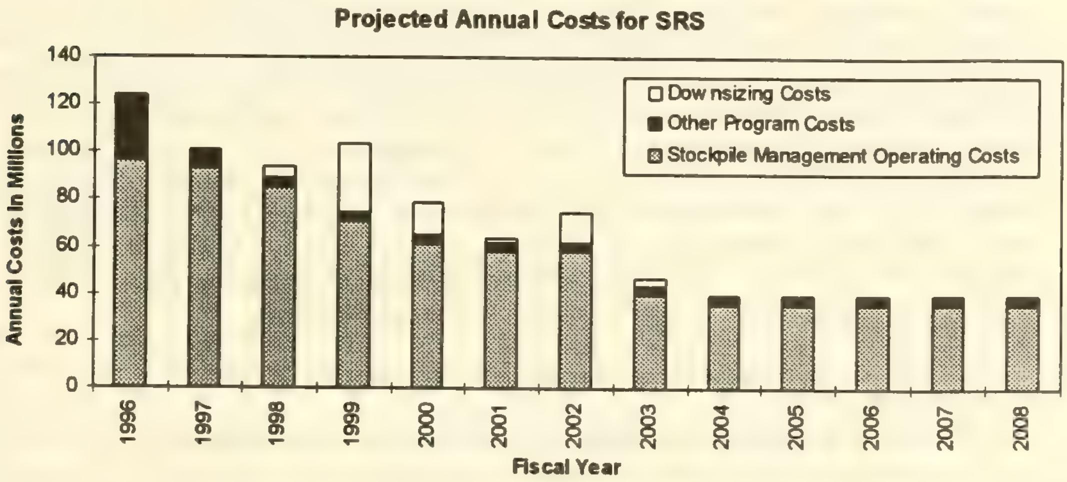
Operations at SRS would be sized consistent with projected workload to support tritium reservoirs in the weapons stockpile. The workload level is more directly related to the size of the weapons stockpile than for any other weapon production mission because of the inherent rate of tritium decay and the associated need to replace tritium reservoirs on a scheduled basis.

Facilities

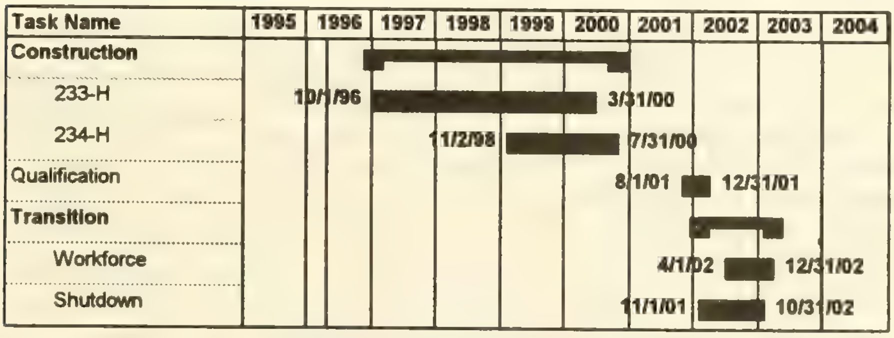
The SRS would downsize and consolidate tritium recycle and surveillance activities into fewer, newer facilities to significantly reduce operating costs. The new Replacement Tritium Facility, building 233-H, would be the principal tritium facility after consolidation.

2. Costs and Schedules

Development of a preliminary budget to operate and downsize the tritium operations at SRS consistent with the START I and START II stockpile sizes has been completed. However, further analysis is required before a final budget can be established. The preliminary numbers presented below do, however, serve to describe anticipated levels for future operations of the tritium recycle facilities. The total project cost to consolidate tritium operations at SRS is expected to be about $75 million over this period. After consolidation, and as the total stockpile size decreases during the next decade, the annual operating costs will decline from the present level of about $90 million. Annual operating costs after 2002 should range between $40-70 million.



The preliminary schedule to implement the downsizing activities is shown below.



3. Risks, Issues, and Uncertainties

The risk associated with consolidating tritium activities at SRS is very low. This is because (1) an experienced workforce will be retained, (2) a fully capable infrastructure is already in place, and (3) the existing process expertise is retained.

NEVADA TEST SITE

Mr. Myers. In the absence of underground nuclear testing, what activities are being conducted at the Nevada Test Site that justify the expenditure of $164 million?

Dr. Reis. Since FY 1992 and the moratorium on nuclear testing, funding to maintain testing capabilities at the Nevada Test Site (NTS) has been reduced from $197 million to $164 million. FY 1997 funding is required to maintain the capability to allow for the resumption of underground nuclear testing within about three years from the directive to test, and to allow for the continued use of the NTS for other Department missions and requirements. Specific activities include maintenance of the physical infrastructure, general site security and site-wide services supporting Stockpile Stewardship. In addition, funding is used to preserve the readiness capability to resume testing by retaining and maintaining a core cadre of highly skilled personnel. Included are skills associated with maintaining the capability and facilities to handle high explosives and special nuclear materials, documenting and archiving knowledge and capabilities, mining, emplacement, stemming, diagnostic, and field engineering capabilities as well as a security force to protect Category I quantities of special nuclear material. The preservation of most of the personnel skills and equipment is accomplished through the conduct of an experimental program that also provides vital data to the Department of Energy's Stockpile Stewardship and Management Plan. A key component of this experimental program is the subcritical experiments (four experiments planned for FY 1997) announced by the Secretary of Energy in October 1995. Those elements of readiness that are not covered by this experimental plan are covered by a limited set of training exercises. Many of the activities now considered fundamental to the readiness posture have been driven by the Defense Nuclear Facilities Safety Board recommendations.

Mr. Myers. Have you surveyed every possibility to reduce these costs?

Dr. Reis. The $164M requested in FY 1997 is a reduction from the preceding year's comparable appropriations of $183M. Multiple approaches are pursued each year in a continuing effort to reduce the costs of maintaining the directed readiness posture. First, every effort is made to identify activities which improve the technical skills required to test nuclear weapons at a lower cost. Personnel with the technical skills which support test diagnostics are being deployed to support national laboratory initiatives in advanced computing, laser and hydrodynamic instrumentation areas. This action has reduced the cost of maintaining the unique diagnostic instrumentation skills required in nuclear testing and has allowed the personnel who possess those skills to remain technologically up to date. Second, all processes involved in conducting a nuclear weapons test are reviewed to identify new technologies and/or reengineering approaches which will make them available at reduced cost. Processes such as drilling, construction, radiological monitoring, analytic laboratory and meteorological support have been subjected to outsourcing and reconstitution reviews to maintain only the most cost effective strategies. Third, the infrastructure is continually evaluated in terms of need and cost with enhanced consideration to privatization. Further the largest management and operating contracts supporting the NTS were competitively consolidated into a single performance-based management contract during FY 1996. This performance based contractor has been incentivized to reduce indirect costs while achieving all critical programmatic requirements.

TECHNOLOGY TRANSFER

Mr. Myers. How many joint DOE-industry programs are funded in the core stockpile stewardship and management programs?

Dr. Reis. Currently our major efforts in partnering with industry are associated with the Accelerated Strategic Computing Initiative. In FY 1996, there will be two industrial partnerships focussed on high end computing. The first partnership, code named Option Red, is the announced R&D contract with INTEL to deliver a 1.8 peak trillion floating point operations per second (TFlop) system by December 1996. Proposals for the second partnership, Option Blue, are currently being developed by the computer industry, and a contract is expected to be awarded by June 1, 1996. These partnerships will continue into FY 1997, with the addition of two to four new partnerships to explore critical technology issues, and an additional Option Blue type partnership in the core stewardship program to provide a third high end computer for development activities. Industrial partnerships are fundamental to achieving ASCI program objectives of assuring an adequate supply of high end computing capability and capacity to meet DP's needs for stockpile stewardship in the post-underground nuclear testing era.

There are 21 other joint DOE-industry programs in the Core Stockpile Stewardship program. Stockpile Management has one joint program at the Y-12 Plant.

Mr. Myers. What is the funding associated with these activities?

Dr. Reis. ASCI's funding for these partnerships is about $30 million in FY 1996, and about $45 million in FY 1997. Other Core Stewardship partnerships, including the second Option Blue computer for the stewardship base program, are valued at about $55.5 million annually, and the funding associated with the joint DOE-industry program at the Y-12 Plant is $40,000 in FY 1996 only.

Mr. Myers. How do the activities funded in the technology transfer program differ from those joint DOE-industry activities funded in the core program budget.

Dr. Reis. Joint DOE-industry programs essential to accomplishment of direct DP mission are funded within the Core Stockpile Stewardship and Core Stockpile Management programs. These projects are initiated when a Defense Programs research or technology development program can be most efficiently and effectively carried out by sharing the effort with an industry partner. An example is the technology development effort at the Y-12 Plant to develop a metal-ceramic composite crucible for uranium and related metals to reduce carbon pickup. Such a crucible would enable single-step casting of uranium-6 niobium alloy and higher material efficiency in support of weapons programs. An industrial partner, Blasch Ceramics and Surface Alloys, is seeking to develop a similar crucible to license, demonstrate, and commercialize. This firm agreed to jointly fund this development task with participation in-kind of $40,000. This task will be completed in FY 1996.

The technology transfer partnerships were focussed on providing specific funding to the national laboratories to enable them to share their scientific and engineering expertise with industrial partners for the dual benefit of maintaining DP core capabilities and increasing U.S. industrial competitiveness during the time period when the DP mission was in a state of transition to the post-underground nuclear testing era. Now that the transition to science based stockpile stewardship and management is well underway, we have, with Congressional support, concluded many of these partnerships and redirected future partnerships to critical new initiatives within the core stewardship and management programs. However, our positive experience with the Technology Transfer programs at the laboratories will continue to benefit us as we have learned how to most effectively utilize industrial partnerships as a valuable resource for DP mission accomplishment.

Mr. Myers. Can you assure the Committee that current technology transfer activities are being closely reviewed to ensure they contribute to critical nuclear weapons technology needs?

Dr. Reis. The Defense Programs technology transfer program traditionally emphasized a combination of projects and programs that strongly supported the core competencies at the laboratories and facilities and provided some benefit to the nuclear weapons mission. Over the past year, the program has been strengthened by involving the weapons program managers and staff in project and program selection and activity. The program has also been transitioning to projects which support the Accelerated Strategic Computing Initiative, advanced information infrastructure for the weapons complex, and advanced manufacturing. Projects which do not support such goals have been reduced, canceled or transferred to other programs wherever possible. We have further reduced the budget request for FY 1997 and expect to transfer several sets of projects to other DOE offices, to more closely align them with Department priorities and to focus the technology transfer program entirely on the weapons program.

Mr. Myers. Please list the major technology transfer activities which will be conducted by each laboratory in fiscal years 1995, 1996 and 1997, including funding for each task.

Dr. Reis. The breakout of funding for activities in FY 1997 is an estimate. The program is currently undergoing a transition to limit projects to only those that strongly support the weapons mission, with particular emphasis on advanced manufacturing, the Accelerated Strategic Computing Initiative (ASCI), and the Enhanced Surveillance Program. Projects with lesser weapons program benefit are expected to be canceled, reduced, or transferred to other DOE offices where there is greater mission benefit. All AMTEX, most automotive, and most Advance Computational Technology Initiative (ACTI) projects will be transferred out of Defense Programs to the Office of Energy Efficiency and Renewable Energy and the Office of Energy Research. A small number of projects currently identified as automotive and ACTI are expected to be continued in Defense Programs based on strong weapons program benefits. Of the $50 million requested for Technology Transfer in FY 1997, approximately 70 percent ($35 million) will support advanced manufacturing related projects and 20 percent ($10 million) will support ASCI related projects.

A list of major technology transfer activities for FY 1995, FY 1996, and FY 1997 is shown in the following tables, which I would like to insert for the record. The information follows:

Los Alamos National Laboratory

(dollars in millions)

	FY95	FY96	FY97
Major Partnerships			
National Information Infrastructure	2.1	0.0	1.9
Integrated Circuit Manufacturing Program	0.5	2.9	0.0
Automotive	4.5	3.1	0.3
High Performance Computing Program (includes ACTI)	0.4	3.0	1.3
AMTEX	1.1	1.0	0.0
Agile Manufacturing	2.0	-0.8	1.0
Machine Tool Program	0.7	0.2	0.3
Laboratory Partnerships			
Advanced Manufacturing and Precision Engineering	11.8	2.4	5.7
Computer Architecture and Application	5.1	1.3	1.0
Energy and Environment	1.1	0.1	0.0
Materials and Processes for Manufacturing	3.1	1.7	0.4
Microelectronics and Photonics	4.1	0.1	0.2
Small Business Initiative	2.2	0.8	0.7
TOTAL	38.7	15.8	12.8

Lawrence Livermore National Laboratory

(dollars in millions)

	FY95	FY96	FY97
Major Partnerships			
National Information Infrastructure	3.0	0.1	1.9
Integrated Circuit Manufacturing Program	8.8	6.8	1.0
Automotive	5.2	2.6	0.1
High Performance Computing Program (includes ACTI)	0.6	2.8	0.6
AMTEX	3.3	2.2	0.0
Agile Manufacturing	4.5	1.3	2.1
Machine Tool Program	1.3	0.4	0.3
Laboratory Partnerships			
Advanced Manufacturing and Precision Engineering	12.0	6.7	5.2
Computer Architecture and Application	5.0	2.1	1.0
Energy and Environment	1.9	0.6	0.3
Materials and Processes for Manufacturing	0.7	1.2	0.0
Microelectronics and Photonics	8.5	4.3	1.5
Small Business Initiative	2.0	-0.8	0.7
TOTAL	56.8	30.3	14.7

Sandia National Laboratories
(dollars in millions)

	FY95	FY96	FY97
Major Partnerships			
National Information Infrastructure	3.6	0.9	1.9
Integrated Circuit Manufacturing Program	13.9	14.9	7.3
Automotive	14.4	6.8	0.6
High Performance Computing Program (includes ACTI)	1.8	5.2	1.8
AMTEX	4.7	3.9	0.0
Agile Manufacturing	3.7	1.9	1.0
Machine Tool Program	0.9	0.6	0.3
Laboratory Partnerships			
Advanced Manufacturing and Precision Engineering	2.8	0.9	1.7
Computer Architecture and Application	5.8	0.3	0.3
Energy and Environment	1.2	0.0	0.0
Materials and Processes for Manufacturing	6.3	2.4	0.0
Microelectronics and Photonics	13.3	6.4	0.5
Small Business Initiative	2.0	1.3	0.7
TOTAL	74.4	45.5	16.1

LABORATORY DIRECTED RESEARCH AND DEVELOPMENT

Mr. Myers. What amounts are included for the discretionary funding of the laboratory directors in fiscal years 1995, 1996, and 1997?

Dr. Reis. The amounts of discretionary funding allowed the laboratory directors are proposed annually by the laboratory directors and are approved by the Assistant Secretary for Defense Programs, as the cognizant secretarial officer, under the Department's formal laboratory directed research and development (LDRD) program. The amounts (in millions of dollars) for Lawrence Livermore National Laboratory for fiscal year 1995 and projected for fiscal years 1996 and 1997 are respectively: $50.9, $49.1, and $64.0 million. The amounts for Los Alamos National Laboratory are similarly $60.8, $54.3, and $63.0 million, and the amounts for Sandia National Laboratories are similarly $67.9, $67.5, and $70.0 million.

Mr. Myers. By laboratory please provide the amount of funding and the percentages of total funding allowed for discretionary purposes.

Dr. Reis. The amounts of funding and maximum percentages of funding allowed each laboratory for discretionary purposes are shown in a table, which I would like to insert into the record. The information follows:

LABORATORY DIRECTED RESEARCH AND DEVELOPMENT (LDRD)
(in Millions of Dollars and Percentages)

National Laboratory	FY 1995	FY 1996	FY 1997
Lawrence Livermore (LLNL)	$50.9 / 6.0%	$49.1 / 6.0%	$64.0 / 6.0%
Los Alamos (LANL)	$60.8 / 6.0%	$54.3 / 5.5%	$63.0 / 6.0%
Sandia (SNL)	$67.9 / 6.0%	$67.5 / 6.0%	$70.0 / 6.0%

The funding amounts for fiscal years 1996 and 1997 are based on projected total operating and capital equipment funding amounts for LLNL and LANL but only on projected total operating funding amounts for SNL.

GENERAL

Mr. Myers. For each defense facility by appropriations account, please identify the amount of reimbursable work performed for other federal agencies and for other than federal agencies in fiscal years 1995, 1996, and 1997.

Dr. Reis. I would like to submit tables for the record which show the amount of reimbursable work performed for other federal agencies and for other than federal agencies in FY 1995, FY 1996, and FY 1997 at the major DOE facilities that have defense related reimbursable activities. The information follows:

REIMBURSABLE WORK PERFORMED - FEDERAL AGENCIES
Weapons Activities
(obligations in thousands)

	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate
Ames Laboratory	$ 28	$ 82	$ 82
Argonne National Laboratory	28,521	40,400	42,500
Bettis Atomic Power Laboratory	4,169	6,300	6,300
Brookhaven National Laboratory	14,823	2,455	2,219
Idaho Natl Engineering Lab	20,142	64,156	76,887
Kansas City Plant	1,869	6,711	9,093
Knolls Atomic Power Laboratory	2,000	36,700	36,700
Lawrence Berkeley Laboratory	6,404	4,593	3,749
Lawrence Livermore Laboratory	70,051	103,676	101,523
Los Alamos Scientific Laboratory	90,533	86,500	82,000
Lovelace Biomed & Environmental Res Lab	861	200	200
Mound Laboratory	96	0	0
National Renewable Energy Lab	1,221	2,191	508
Nevada Test Site	101,066	28,757	44,257
Oak Ridge Central	70,074	146,144	133,511
Oak Ridge Institute for Science and Education	10,959	6,503	6,530
Pacific Northwest Laboratory	37,911	51,000	52,000
Pantex Plant	118	334	373
Pinellas Plant	-1,230	10,000	0
Rocky Flats Plant	-94	0	0
Sandia Laboratories	226,223	200,564	163,485
Savannah River Laboratory	3,169	4,123	4,553
TOTAL - FEDERAL AGENCIES	**$688,914**	**$801,389**	**$766,470**

REIMBURSABLE WORK PERFORMED - NON-FEDERAL ENTITIES
Weapons Activities
(obligations in thousands)

	FY 1995 Actual	FY 1996 Estimate	FY 1997 Estimate
Kansas City Plant	$ 1,031	$ 1,000	$ 1,000
Lawrence Livermore Laboratory	3,434	0	0
Los Alamos Scientific Laboratory	10,287	13,000	13,000
Lovelace Biomed & Environmental Res Lab	969	2,000	2,000
Nevada Test Site	1,063	5,900	2,700
Pantex Plant	19	200	200
Pinellas Plant	128	500	500
Sandia Laboratories	23,955	29,000	30,000
Savannah River Laboratory	1,441	0	0
TOTAL - NON-FEDERAL ENTITIES	**$ 42,327**	**$ 51,600**	**$ 49,400**

Mr. Myers. How many employees does Defense Programs have at Headquarters in its own offices of ES&H, safeguards and security, and nuclear safety?

Dr. Reis. Defense Programs does not have any offices solely dedicated to ES&H, safeguards and security, or nuclear safety activities. However, in support of the Defense Programs mission, Defense Programs has 18 employees dedicated primarily to environmental activities: 12 to safeguards and security activities and 14 to nuclear safety activities. The support provided by the staff in these areas is matrixed across DP as the needs develop. All technical staff positions have some degree of responsibility related to ES&H, but they have not been included in the totals above because ES&H is not their primary focus.

Mr. Myers. Provide a detailed list of all education activities conducted in fiscal years 1995, 1996, and 1997, the educational institution receiving the funding, and the funding for each activity.

Dr. Reis. A breakout of the science education projects funded by Defense Programs is shown in a table, which I would like to insert in the record. The information follows:

BREAKOUT OF DEFENSE PROGRAMS SCIENCE EDUCATION PROJECTS

	FY 1995	FY 1996	FY 1997
Los Alamos National Laboratory			
Educational Technology			
Education Networking Support	$620,000	$485,000	
GEONet Electronic Bulletin Board	157,000	180,000	
Science Outreach	167,000	125,000	
K-12 Equipment Program	150,000	50,000	
Teaching Hearing Impaired to Speak	372,000	300,000	
Systems Modeling for Education	209,000	150,000	
Distance Learning/Education Technology	240,000	100,000	
Public Awareness			
Science Education Information Online	157,000	70,000	
Practical Applications for Young Scientists	94,000	100,000	
Student Programs			
New Mexico Supercomputing Challenge	472,000	330,000	
Two-Year College Initiative	526,000	450,000	
Critical Issues Forum	291,000	200,000	
Atomic, Molecular and Optical Physics Summer School	109,000	110,000	
Univ. Research Specific to Weapons Technology	0	200,000	
Hypermedia Compact Disk	82,000	81,000	
Teacher Enhancement			
TOPS/TOPS Mentor	687,000	400,000	
National Teacher Enhancement	82,000	94,000	
HBCU/Minority Institutes Development			
Historically Black Colleges and Universities	1,167,000	475,000	
Under Represented Minorities and Females Init.	552,000	450,000	
Institutional Improvement			
Pre-Service Institute for Science and Math	166,000	150,000	
	$6,300,000	$4,500,000	$4,000,000

	FY 1995	FY 1996	FY 1997
Sandia National Laboratories			
Educational Technology			
Telecommunications/DEER	$377,000	$40,000	*
Advanced Manufacturing for Education	20,000	100,000	
Technology Applications for Education	70,000	100,000	
Internal Education Technology Development	70,000	150,000	
Public Understanding			
Science Discovery Center (Albuquerque)	477,000	100,000	
Science Discovery Center (California)	100,000	100,000	
Public Relations and Communications	84,000	0	
Student Support			
Hands-On Minds-On Technology	57,000	20,000	
Manos	47,000	20,000	
Dream Catchers	57,000	20,000	
National Consortium for Graduate Degrees	70,000	50,000	
Minority Engineering Program	40,000	0	
Science Bowls	45,000	0	
Summer Employment for Native Americans	50,000	0	
Summer Employment for Minority Youth	25,000	0	
School Partners	225,000	0	
One-Year On-Campus	20,000	0	
Sandia-CA Science Carnivals	490,000	140,000	
Teacher Enhancement			
University Pre-Service Initiative	230,000	55,000	
Science Advisors	2,142,000	600,000	
Program and External Evaluation	284,000	0	
Lawrence Hall of Science Collaboration	265,000	65,000	
HBCU/Minority Institutes			
American Indian Community College Initiative	310,000	200,000	
HBCU/MI Research Collaborations	160,000	200,000	
Science & Technology Alliance	485,000	390,000	
	$6,200,000	$2,350,000	$2,500,000

	FY 1995	FY 1996	FY 1997
Lawrence Livermore National Laboratory			
Educational Technology			
Technology Resource Center	$875,000	$368,000	*
Scientific Visualization	130,000	458,000	
Public Awareness			
Informal Science (i.e., Fun with Science)	622,000	150,000	
Science Appreciation and Partnerships	200,000	250,000	
Student Programs			
Partnership with Industry and Education	140,000	113,000	
Global Security Cooperative Program		284,000	
AWU Summer Coop		50,000	
Access to Science Teacher Careers	100,000	160,000	
School-to-Career	258,000	103,000	
Natl Physical Science Consortium Students	225,000		
Teacher Enhancement			
Global Concerns Thematic Immersion	778,000	150,000	
Global Climate Change/Global Security	133,000	180,000	
Student Science Research Associates	451,000	272,000	
Science and Technology Inquiry Partnerships	348,000	168,000	
Summer (Teacher) Research Internship	510,000	44,000	
Biotechnology	420,000		
Systemic Workshops and Evaluation	531,000		
HBCU/Minority Institutes	641,000	400,000	
Arkansas University	65,000		
Fort Valley State	151,000		
Fisk University	55,000		
Howard University	53,000		
	$6,686,000	$3,150,000	$3,000,000

	FY 1995	FY 1996	FY 1997
Albuquerque Operations Office	$100,000	$0	*
Special Employment Programs			
MESA - Collaboration with SNL (NM)			
HBCU and MI Students			
Nevada Operations Office	125,458	0	*
HBCU/Minority/Community Activities			
American Indian Students	92,600		
Fisk University	88,882		
Nevada University	10,000		
Gordon McCaw Elementary	15,000		
3+2 Program			
Fort Valley State	253,060		
JASON			
Science Bowl			
Partnership with Clark County	15,000		
Oakland Operations Office	53,068	0	*
3+2 Fort Valley State/UNLV Partnerships with Local HBCU/MI schools - employment			
Morehouse College	8,000		
North Carolina A&M	5,000		
Southern University	12,500		
Southwestern	27,432		
Spelman College	8,000		
Headquarters/Other			500,000
TOTAL EDUCATION	$20,000,000	$10,000,000	$10,000,000

*Proposed projects for FY 1997 are being reviewed to ensure a well-balanced mix of projects which are tied directly to the Department of Energy/Defense Programs missions and goals as well as the laboratories core competencies.

GENERAL

Mr. Myers. For the Management and Administration program and the Special Projects program in stockpile management, please provide a list of activities by location including the funding levels for each activity for fiscal years 1995, 1996 and 1997.

Dr. Reis. The breakout for the Management and Administration program and the Special Projects program in stockpile management is shown in a table which I would like to insert in the record. The information follows:

SPECIAL PROJECTS
($ in Thousands)

	FY 1995	FY 1996	FY 1997
Albuquerque Operations Office			
Pantex Site-Wide EIS	$ 365 1/	$3,400	$ 800
Radiation Effects Research	2,000	2,000	2,000
Container Packaging Safety Review	1,200	1,200	1,200
Ross Aviation	1/	6,700	6,800
Other	1/	9,008	8,634
Subtotal, Albuquerque	$ 3,565	$22,308	$19,434
Oak Ridge Operations Office			
Resumption Support	3,750	3,200	800
Savannah River Operations Office			
Wackenhut Services Inc.	2,600	3,600	3,600
Savannah River Ecology Lab.	165	175	185
Ross Air	160	160	160
Subtotal, Savannah River	2,925	3,935	3,945
Headquarters			
Other	1/	4,094	3,994
Total, Special Projects	$10,240	$33,537	$28,173

1/ Funded in whole or in part by prior year uncosted balances.

ATOMIC ENERGY DEFENSE ACTIVITIES
WEAPONS ACTIVITIES
Management and Administration Subprograms by Site
($ Thousands)

	FY 1995	FY 1996	FY 1997
Total Stockpile Management			
Other	13,487	11,852	8,972
Information Outreach	6,209	6,456	6,691
Information Services	39,208	38,725	35,448
Taxes	9,413	10,778	11,144
Executive Direction	8,536	9,385	9,600
Human Resources	24,242	26,147	25,666
CFO	20,841	21,893	22,088
Procurement	8,590	9,631	9,651
Legal	2,142	2,438	2,557
Logistics Support	14,438	15,695	15,831
Administrative Support	11,540	12,242	12,461
Quality Assurance	9,972	9,458	9,263
Management/Fee	32,564	36,973	37,744
Laboratory Directed R&D	11,983	14,071	13,838
Inventory Change	45	46	46
	213,210	225,790	221,000
Kansas City Plant			
Other	1,633	2,697	1,407
Information Outreach	567	607	620
Information Services	18,826	20,719	19,449
Taxes	3,404	3,531	3,246
Executive Direction	2,635	2,875	2,896
Human Resources	13,270	13,949	13,221
CFO	3,555	3,919	3,934
Procurement	3,439	3,453	3,418
Legal	469	502	514
Logistics Support	6,062	6,351	6,359
Administrative Support	3,489	3,629	3,646
Quality Assurance	1,372	1,493	1,501
Management/Fee	16,804	16,419	16,703
Inventory Change	45	46	46
	75,570	80,190	76,960
Los Alamos National Lab			
Other	4,168	4,167	4,171
Information Outreach	2,511	2,604	2,672
Information Services	1,880	1,881	1,905
Executive Direction	324	475	524
Human Resources	1,427	1,850	2,039
CFO	457	927	1,021
Procurement	43	60	66
Legal	643	888	978
Logistics Support	130	677	747
Administrative Support	711	975	1,074
Quality Assurance	369	521	574
Management/Fee	1,060	1,593	1,756
Laboratory Directed R&D	4,257	6,312	5,683
	17,980	22,930	23,210

ATOMIC ENERGY DEFENSE ACTIVITIES
WEAPONS ACTIVITIES
Management and Administration Subprograms by Site
($ Thousands)

	FY 1995	FY 1996	FY 1997
Pantex Plant			
Other	3,401	1,972	1,390
Information Outreach	1,093	1,207	1,217
Information Services	10,155	10,159	10,195
Taxes	71	72	72
Executive Direction	1,787	1,881	1,891
Human Resources	4,795	4,766	4,775
CFO	3,031	2,868	2,884
Procurement	2,087	2,178	2,187
Legal	708	719	721
Logistics Support	2,572	2,578	2,582
Administrative Support	2,477	2,487	2,497
Quality Assurance	4,851	4,131	4,136
Management/Fee	8,582	9,802	9,713
	45,610	44,820	44,260
Sandia National Lab			
Other	1,270	974	1,012
Information Outreach	2,038	2,038	2,182
Information Services	2,765	1,148	1,191
Taxes	3,022	4,349	5,106
Executive Direction	1,286	1,294	1,415
Human Resources	1,860	1,887	1,906
CFO	2,658	2,667	2,679
Legal	263	266	279
Logistics Support	1,403	1,424	1,477
Administrative Support	1,093	1,096	1,104
Quality Assurance	852	857	880
Management/Fee	1,124	1,261	1,424
Laboratory Directed R&D	7,726	7,759	8,155
	27,360	27,020	28,810
Savannah River Plant			
Other	3,015	2,042	992
Human Resources	2,726	3,403	3,424
Procurement	2,743	3,641	3,671
Administrative Support	1,636	1,737	1,770
Quality Assurance	230	267	273
	10,350	11,090	10,130
Y-12 Plant			
Information Services	5,582	4,818	2,708
Taxes	2,916	2,826	2,720
Executive Direction	2,504	2,860	2,874
Human Resources	164	292	301
CFO	11,140	11,512	11,570
Procurement	278	299	309
Legal	59	63	65
Logistics Support	4,271	4,665	4,666
Administrative Support	2,134	2,318	2,370
Quality Assurance	2,298	2,189	1,899
Management/Fee	4,994	7,898	8,148
	36,340	39,740	37,630

GENERAL

Mr Myers For each office in the program direction account, identify which activities are funded in advisory and assistance services and provide funding for each activity for fiscal years 1996 and 1997.

Dr Reis The Department is preparing a Department-wide response to questions similar to this one on support services, which will be provided by the end of May.

NATIONAL IGNITION FACILITY

Mr. Myers Surveying the national laboratories, universities, and the private sector, where does the best laser expertise/facility reside in the United States?

Dr. Reis Laser expertise and facilities are widespread throughout the country, all of the Department's laboratories and most universities have some form of laser expertise and facilities As examples, Stanford University has been a leading academic center in fundamental laser development throughout the history of lasers and the Center for Research and Education in Optics and Lasers at the University of Central Florida is a strong new university center There are significant industrial companies that specialize in lasers such as Spectra Physics and Coherent as well as major companies that conduct significant laser development such as TRW and Hughes Research.

Defense Programs is most interested in the areas of high average power lasers and high energy lasers Within universities, the Laboratory for Laser Energetics at the University of Rochester is by far best in this area. Their new Omega-Upgrade glass laser facility, funded through the Inertial Confinement Fusion program, could become the most outstanding high power laser facility in the world during the next 5 years. The Naval Research Lab operates an important high power laser, the Nike, which is a gas laser. However, Lawrence Livermore National Laboratory (LLNL) is recognized world-wide as the unquestioned leader in high power laser expertise and facilities Currently, the Nova laser at LLNL and the Omega laser at Rochester are the two most powerful lasers in the world (about 40 kilojoules) The Los Alamos National Laboratory (LANL) has constructed laser facilities in the past, however, they are not currently operating a major facility

Mr. Myers. Where does the best laser expertise/facility reside in the world?

Dr. Reis Compared to the United States, there are several other countries that have expertise/facilities of a similar but less advanced nature and that have the potential to grow into world leadership. There are important laser facilities and expertise in Japan at the Osaka University and the Kansai Establishment of the Japan Atomic Energy Research Institute, in England at the Atomic Weapons Establishment and the Rutherford Laboratory of the Oxford University, and in France at Limeil (to be moved to Bordeaux). Other countries have important laser expertise at research centers and suppliers of lasers for research and industry, for example, Spectra Physik in Germany and Lumonics in Canada.

Mr. Myers. How does the laser capability of the Lawrence Livermore National Laboratory compare?

Dr. Reis. The Lawrence Livermore National Laboratory is recognized worldwide as an outstanding laser institution. This is especially true in the area of high power lasers. The Nova is the most productive high power laser facility in the world and the Beamlet, a prototype laser for the NIF, is testing the most advanced technology. For 1994 and 1995 combined the LLNL Laser Programs produced 10 major scientific awards, 6 R&D 100 awards, 62 patents issued, and 299 referenced publications. These measures are unmatched by any other laser center.

Mr. Myers. As part of the inertial confinement fusion (ICF) programs, what other countries are exploring technologies similar to that proposed for the National Ignition Facility (NIF)?

Dr. Reis. France and the United Kingdom are exploring technologies similar to those proposed for the NIF. The University of Osaka in Japan is also considering a major upgrade of their laser using advanced technology. However, only France has an approved a project that is similar to the NIF.

Mr. Myers. What is the status of these projects and how do they compare to NIF?

Dr. Reis. The French Laser Megajoule (LMJ) Project was announced by (former) President Mitterrand of France in the spring of 1995 as a planned 2 megajoules laser system to be built near Bordeaux as part of their stockpile stewardship program. The current schedule for the completion of this project is in 2010 with the first quarter of the system to be completed in 2005. To demonstrate the laser technology of the LMJ, France is building a Laser Integration Line (LIL) which is an 8-beam prototype producing roughly 60 kilojoules to be completed in 2001. The UK is currently considering a 32-beam non-ignition laser facility (Helen Upgrade) with approximately 150 kilojoules compared to NIF at 192 beams and 1.8 megajoules. A decision on proceeding with the Helen Upgrade is expected in 1996.

Mr. Myers. What types of collaborations with other countries have you pursued?

Dr. Reis. *Deleted*

We are sharing some aspects of the NIF laser technology development with France in order to minimize our costs, particularly with laser glass developments where we plan to share common manufacturers. Similar cost sharing arrangements are being sought with the UK, depending on the approval of their project.

Mr. Myers. Will NIF duplicate any proposed or current projects being developed by other countries?

Dr. Reis. No. NIF will be built 8 years in advance of the only other proposed ignition facility, the French LMJ. Both the French and UK planned systems are highly dependent on the laser development work for the NIF now being done in the US.

Mr. Myers. The engineering, design, inspection and construction and management costs for the National Ignition Facility are estimated at 28% and contingency is included at 21% These estimates are lower than many smaller projects such as the Dual-Axis Radiographic Hydrodynamic Facility and the Atlas project at Los Alamos. What process did you use to estimate these activities?

Dr. Reis. A detailed description of the process for preparing the National Ignition Facility cost estimate is described in Volume 4: Operations, Schedule, Costs and Assessments of the Conceptual Design Report of May 1994. The process is based upon 25 years of experience building 6 successively larger lasers at LLNL. A summary of the key features of this process is included in this response.

Costs were derived in a "bottom up" estimate at the lowest Work Breakdown Structure level necessary for accuracy. The Automated Estimating System developed by Martin Marietta Systems, Inc. was used to calculate costs for the project taking into consideration schedule, contingency and escalation data. A probabilistic contingency analysis was conducted by the Bechtel Corporation using the Microrac Monte Carlo code. The estimated contingency assumes a 70 percent confidence of staying within the project budget Cost escalation was based on DOE published rates for general construction and defense programs.

Eighty-seven percent of the project costs were developed from catalogs (10 percent), vendor estimates (34 percent), engineering drawings (24 percent), and previous experience (19 percent) The remaining 13 percent came from engineering analysis (11 percent) and expert opinion (2 percent). The project documentation and costs were reviewed in detail by the Independent Cost Estimate team from Foster Wheeler USA. This review found that "the overall variance between the Independent Cost Estimate and the Project Office Total Estimated Cost and Other Project Cost is negligible."

Mr. Myers. How do these estimates correspond to the actual or estimated costs for these activities in construction projects of comparable complexity either at the Department or other government agencies?

Dr. Reis. I would like to submit a table for the record of the estimated costs, in terms of percentages, for engineering, design and inspection (ED&I); construction management; project management; and contingency, for projects of comparable complexity to the NIF.

The estimated costs for the NIF compare favorably with other DOE projects of comparable complexity. In comparing costs between projects, however, it is important to understand that there are many factors that contribute to the range of costs for ED&I and construction and project management costs. The ED&I costs are higher for some projects that are substantially constrained by site requirements whereas other sites are relatively free of such considerations Large facility projects may benefit from economies of scale making the costs for ED&I and construction and project management costs a smaller percentage of total construction costs. A project funded for design only would have a high percentage of ED&I costs. In addition, the complexity of the underlying technology of the facility will have an impact on ED&I and management costs. In terms of contingency, the amount remaining from the initial contingency estimate will shrink as a project nears completion and the funds are moved out of contingency and into other funding categories. The important point to keep in mind is that each project is unique and comparisons of percentages allocated for specific categories of costs can be misleading without knowing the specifics of the individual projects.

The information follows:

PROJECTS OF COMPARABLE COMPLEXITY

Project Number	Project Title	Total Estimated/ Total Project Costs ($M)	Engineering, Design & Inspection (%)	Construction Mgt. (%)	Project Mgt. (%)	Contingency (%)
96-D-111	NIF	842.6/1,073.6	16.6	2.2	9.4	20.6
94-G-304	B-Factory	177.0/293.2	26	\a	3	23
94-E-200	Tokamak TPX	610.0/742.0	53 \b	6	10.9	27
92-G-302	Fermilab Main Injector	229.6/259.3	16	\a	\a	20
91-G-300	RHIC	475.3/595.3	18	12	\a	20
89-R-402	6-7 GeV Synch. Radiation Source	467.2/811.9	17.8	3.4	\a	11.3
87-R-203	CEBAF	313.2/513.1	21.4	\a	5.9	19
81-D-101	PFBA-II	45.7/64.4	41	\a	\a	6
Capital Equip. Funded	OMEGA Upgrade	61.0/73.0	3	\a	8	4

\a Not explicitly identified in the data sheet

\b If the replacement construction cost of reusable facilities and equipment is considered, ED&I is 35%.

Source: Latest appropriated Construction Project Data Sheet for each project.

CONSTRUCTION PROJECTS

Mr. Myers. Approximately 165,700 gross square feet of space will be included in Project 96-D-104, Processing and Environmental Technology Laboratory, at Sandia, but only 42,327 net square feet of space from existing facilities will be vacated. Please explain this discrepancy.

Dr. Reis. The Processing and Environmental Technology Laboratory (PETL), in addition to replacing space from existing facilities, provides Sandia with new capabilities and, therefore is larger.

The 165,700 gross square feet represents 99,420 net square feet. The difference between this number and 42,327 is additional laboratory space.

Mr. Myers. Since this appears to be standard office and laboratory construction, why do design, construction and project management costs exceed 22 percent?

Dr. Reis. The design, construction, and project management costs for the PETL are 22 4 percent, because reflecting the design of a new laboratory building and the design work necessary to ensure safety and health of the work force.

Mr. Myers. Identify the contractor who is providing each of these services and the funding for each.

Dr. Reis. Lockwood Greene will provide Architectural Engineering Services for this project at a cost of $3.3 million. Specialized design management, construction management, project management will be provided by Sandia Corporation staff for $2.8 million.

Mr. Myers. Project 96-D-102, Nuclear Weapons Stockpile Stewardship Facilities Revitalization, includes drilling new water wells, improving water storage and distribution lines for fire protection, roof replacements, and an electrical substation modernization. These appear to be common commercial-type activities. Why do design, and construction and project management costs exceed 22 percent for this type of construction activity?

Dr. Reis. There are four subprojects in this line item. The collective design, construction and project management costs (ED&I) are 22 percent for the four projects. Each subproject will be addressed separately.

The ED&I costs for the Fire Protection Improvements at LANL are 24 percent reflecting the scope of a project which involves retrofitting approximately 200 existing buildings throughout the Laboratory. The design involves verifying the as-built drawings for these buildings as well as new drawings for fire sprinkler systems, lightning protection systems, and many other ancillary systems in these 200 buildings. Inspection of the work will require the services of more personnel scattered throughout the Laboratory than does a conventional project.

The ED&I costs for the Water Well Replacements at LANL are 20.6 percent and reflects some lessons learned from a previous water well contract and the need to be more involved in the review and inspection of the construction to avoid some problems which have rendered one previous well unusable at this time.

The ED&I costs for the 138kV Substation Modernization at the Nevada Test Site (NTS) are 17.7 percent which reflects the singular work of substation upgrades and the lack of complexity in accomplishing this electrical work.

The ED&I costs for the Roof Replacement at LLNL are 17.6 percent which reflects the limited amount of design work necessary to accomplish this task.

Mr. Myers. Were these projects competitively bid? If so, provide a list of the contractors who bid on each subproject.

Dr. Reis. Two of the subprojects are FY 1997 new starts and are awaiting authorization of funding, so no bidding has, as yet, taken place. The design work for the other two projects will be competitively bid when the requests for proposals have been completed, but no contracts have yet been awarded for this work. The required FY 1996 funding for proceeding with the competitive process of acquiring the engineering firms for ED&I work is the first funding available to the sites for use.

Mr. Myers. Identify by name the contractor who is providing the design, construction management, and project management for each subproject and include the cost of each of these activities for each subproject.

Dr. Reis. No contracts have been awarded for any of the design work for the above four subprojects. However, each of the three sites involved, LANL, LLNL, and the Nevada Test Site, plan to provide its own construction management and project management on its respective project(s).

Mr. Myers. The cost of construction for the Dual-Axis Radiographic Hydrodynamic Facility (DARHT) has increased from the original cost estimate of $53 million to the current estimate of $105.7 million. Please list each of the cost increases and explain why this item was not included in the original estimate.

Dr. Reis. The first increase in TEC was reported in the FY 1994 construction project data sheet. In FY 1992 the DARHT construction project and procurement of Special Facilities Equipment had been deferred until a certain desired level of performance for the accelerator could be demonstrated. Following completion of this performance demonstration, an assessment was conducted by a specially appointed Hydrotest Program Assessment Independent Consultants (HPAIC), and two reviews were conducted by the DARHT Feasibility Assessment Independent Consultants (DFAIC). Following these actions, a Baseline Change Proposal (BCP) was generated by the Los Alamos National Laboratory (LANL), and approved by Defense Programs, which increased the total estimated cost (TEC) from $53.4 million to $81.4 million. This BCP revised the scope, schedule, and cost of the project to reflect the revised requirements for one accelerator.

The following summary outlines this increase which I would like to insert in the record The information follows:

DARHT INCREASE IN SCOPE AND COSTS
FY 1994 CONSTRUCTION PROJECT DATA SHEET
(IN MILLIONS OF DOLLARS)

Baseline	$ 45.3 (w/o contingency)
Additional Environmental, Safety and Health	0.5
Project Stretch Out	16.7
Design Changes	10.4
LLNL Support	0.8
Reductions/Underestimated/Underscoped	1.7
Subtotal	$ 75.4
Contingency	$ 6.0
TOTAL	$ 81.4

Funding was appropriated in FY 1994, FY 1995, and FY 1996 to support this new requirement. This was the cost estimate at the time a stop work injunction was issued by the Federal District Court in Albuquerque, New Mexico, in January 1995.

Following the imposition of the injunction, while an environmental impact statement (EIS) was being prepared, DOE conducted a programmatic review of the DARHT project to ascertain its capabilities to further the Department's Stockpile Stewardship program. Additionally, comments and concerns raised during the stakeholder review of the EIS prompted the DOE to consider containment as a part of the project. This led to the determination that containment of the hydro-test explosions was in the best interest of the Department, the public, and the work force. These reviews therefore concluded that, the accelerator energy level should be raised to 20 million electron volts (MeV), containment of the hydro-test shots should be phased in, and, due to advancement in the state-of-the-art, enhanced diagnostics could be added to the project. These changes and improvements, along with the costs of delay have increased the cost estimate to its new total of $105.7 million. The following summary outlines this increase which I would like to insert in the record. The information follows:

DARHT INCREASE IN SCOPE AND COST FOLLOWING INJUNCTION
FY 1997 CONSTRUCTION PROJECT DATA SHEET
(IN MILLIONS OF DOLLARS)

Baseline	$ 75.4 (w/o contingency)
Injunction/EIS Delay Cost	4.6
20 MeV Accelerator	6.5
Enhanced Diagnostics	1.1
Containment (Phase 1)	8.6
Unanticipated Construction Costs	2.6
Subtotal	$ 98.8
Contingency	$ 6.9
Total	$105.7

Mr. Myers. What assurance can you give the Committee that this is the final cost increase?

Dr. Reis. The recent change to the DARHT project costs, as noted in the Construction Project Data Sheet, reflect project changes resulting from the Environmental Impact Statement and DOE's subsequent Record of Decision. These include certain costs accrued from the decision in the ROD to implement, phased-in over time, containment of explosive experiments in vessels to mitigate environmental impacts. Some increase also accrued from the decision in the ROD to increase the first axis energy to 20 MeV, significantly improving the capability of the facility to support stockpile assessment and certification in the near term, which is a straightforward and cost-effective change using existing equipment designs. Finally, some cost increase resulted from the work stoppage and delay due to the Federal Court injunction. The revised TEC and baseline change reflect these additional costs for the first phase of the project as discussed in the CPDS.

Further costs are not anticipated for the first phase of the project and contingencies in the project TEC should be adequate. The TEC in the TEC in the current CPDS was prepared assuming a relatively prompt dissolution of the injunction and resumption of construction. Although, the injunction has now been lifted and the case dismissed, we do not know whether the Court's decision in favor of DOE will be appealed. It is possible, though not expected, that added time to resolve an appeal, if one is filed, would result in some additional costs.

The Committee may also note that in the ROD the Department determined its intent to complete both of the two radiographic axes of the facility to support the vital needs of the Department's stockpile stewardship responsibilities. The second axis project has, for some years, been separated as a subsequent phase of the facility and is now explicitly combined with the first phase of the project in the FY 1997 CPDS to form a single line-item for the entire project. Completion of the first phase of the project will provide an initial operating capability; however, DOE intends to operate DARHT in its essential dual-axis configuration. Additional outyear funding will be requested upon determination of the technical requirements and optimum funding profile to complete the entire facility. Although, the injunction has now been lifted and the case dismissed, we do not know whether the Court's decision in favor of DOE will be appealed If not appealed, the facility's project planning to determine this profile and completion of the facility can be quickly planned The second-axis project is described in the current CPDS, but the funding request in the present CPDS explicitly excludes these costs.

Mr Myers Why do design, construction and project management costs exceed 50 percent for Project 96-D-105, the Contained Firing Facility Addition, at Livermore?

Dr Reis This facility has no precedent anywhere It is a unique, state-of-the-art testing facility that involves the interface of at least three highly complex technological factors--linear-accelerator-induced flash x-rays, containment of all products of a large detonation, and ultrahigh speed photography. As such, and as an economical partial substitute for underground and atmospheric testing of nuclear weapons components, the project must be assured of success throughout its design and construction.

As a research laboratory, the Lawrence Livermore National Laboratory overhead rates might be higher than average for other facilities However, due to the specialized nature of this complex facility, a large part of the design, construction management, and all of the project management, must necessarily be done by in-house personnel The direct cost of design, construction and project management costs is currently estimated at $8.1 million or 32 percent of the direct construction and equipment costs. Applications of Laboratory overhead charges increase these costs to $13 million or 52 percent.

Mr. Myers Provide the name of the contractor providing each service and funding for each activity.

Dr. Reis. The Parsons Company will provide Architectural/Engineering Services for the project at a cost of $3 7 million. All remaining design and inspection tasks will be performed by Lawrence Livermore National Laboratory staff at a cost of $4.5 million. Laboratory staff will also provide all Construction Management at $2 0 million and Project Management at $3.2 million.

Mr. Myers. Engineering, design, and inspection and construction and project management costs range from approximately 22 percent to almost 50 percent for weapons activities and construction projects. There does not seem to be a pattern reflecting size or complexity of the project or radioactive hazards; i.e., the National Ignition Facility includes 28 percent for these costs while Structural Upgrades to the Kansas City Plant includes 38 percent, and Contained Firing Facility at Livermore includes 52 percent. How do you explain these significant differences in costs?

Dr. Reis. There are several factors which contribute to the range of costs for engineering, design, and inspection (ED&I) and construction and project management costs For example, some projects may be substantially constrained by site requirements where the new work must be seamlessly integrated with an existing facility which may also have to remain in continuing operation; e.g., Structural Upgrades to the Kansas City Plant and Contained Firing Facility (CFF) at Livermore. These costs would not necessarily compare favorably with ED&I and construction and project management for sites which more closely resemble "green field" conditions; e.g., the National Ignition Facility (NIF). Large facility projects such as the NIF may also benefit from economies of scale where the costs of ED&I and construction and project management are a smaller percentage of the total project costs. Similarly, these ED&I and construction and project management costs would be lower for projects for which substantial costs are attributed to replication of modules; i.e., design it once and replicate it as in the case of laser glass modules for the NIF.

For the projects mentioned, each is totally different in terms of technologies involved, schedules for design and construction, and facility functions. For example, the Structural Upgrades project at Kansas City has higher ED&I and construction and project management costs because of the nature of the work involved which is essentially to retrofit structural members within an existing building. Each structural retrofit will require a pre-construction engineering analysis, a design specific for each individual application, inspection during installation of each retrofit, and a post construction inspection analysis for each retrofit application. In contrast, because the Contained Firing Facility builds onto an existing facility, it must be sensitive to the existing site and facility configuration.

NUCLEAR TESTING

Mr. Myers. What is the status of other countries' nuclear testing programs?

Ms. Rohlfing.

DELETED

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[1] Ground water at that location reportedly is encountered at depths below 100 meters.

RUSSIAN NUCLEAR WEAPONS LABORATORIES

Mr. Myers. Can you describe the state of the Russian nuclear weapons laboratories?

Ms. Rohlfing.

DELETED

COMPREHENSIVE TEST BAN TREATY

Mr. Myers. What is the status of negotiations on the Comprehensive Test Ban Treaty (CTBT)?

Ms. Rohlfing. Following the consensus adoption of the CTBT resolution in the 1993 United Nations General Assembly, multilateral negotiations on a Comprehensive Test Ban Treaty began in the Conference on Disarmament (CD) in Geneva in January 1994. Negotiations continued through 1995 and into 1996. There is currently a "rolling text" of the treaty, as well as several national attempts to create "visionary" treaty texts, most notably a "clean" text recently introduced by Australia .

President Clinton's August 11, 1995 announcement that the United States would support a true zero yield CTBT energized negotiations. Following the U.S. announcement, the United Kingdom and France also declared their support for a true zero yield CTBT that will ban any nuclear weapon test explosion or any other nuclear explosion. After his Hyde Park summit meeting with President Yeltsin, President Clinton announced on October 23, 1995, that the United States and Russia had agreed jointly to pursue a zero yield CTBT. Many of the CD's 38 members welcomed these developments.

The Conference on Disarmament is close to finalizing the structure of the International Monitoring System and the number and location of its seismic, radionuclide, hydroacoustic and infrasound sensors. Russia has proposed enhanced monitoring at the nuclear test sites, and the United States is currently attempting to meet Russian concerns to ensure equivalence of monitoring capability at these sites.

Other issues which remain to be resolved in the multilateral negotiations include requirements for treaty entry-into-force and on-site inspection provisions. It is the goal of the United States to conclude negotiations in Geneva as soon as possible so that the treaty can be sent to the 51st United Nations General Assembly this fall to be open for signature.

NORTH KOREA

Mr. Myers. Please explain why the cost of the North Korean spent fuel program continues to increase. We were originally informed that the $10 million reprogramming, which this Committee approved, would provide full funding. Then last year the department requested an additional $3.6 million which was to provide final funding. Now you are back again with an additional request in fiscal year 1997 for $5.0 million.

Ms. Rohlfing. U.S. responsibilities under the U.S.-DPRK Agreed Framework are successfully proceeding toward the ultimate objective of placing the 8,000 fuel rods in canisters for long-term storage under International Atomic Energy Agency (IAEA) safeguards. The project is comprised of three phases: first, water treatment to stabilize and clarify pool water to limit and reverse the growth of algae as well as slow the corrosion of the spent fuel elements; second, removal of the thick sludge from the pool floor caused by the corrosion of the magnesium oxide (MAGNOX) fuel element cladding; and third, cleaning and conditioning of the fuel elements and placement in storage canisters for securing in storage racks under IAEA safeguards.

The U.S. Spent Fuel Team has made significant progress. To date, the United States has completed Phases I and II. We have also completed the design, procurement, installation and successful testing of all the major elements of this system. In addition, U.S. personnel have maintained an almost continuous presence at the Nyongbyon facility since September 1995. The first phase was completed in September 1995. This clarified the pool sufficiently to allow moving the spent fuel baskets to an adjacent pool and performing other activities in the pool. The sludge caused by the corrosion of MAGNOX cladding was worse than anticipated and had accumulated on the floor of the pool to a depth of 6 to 8 inches. This complicated and delayed the vacuuming effort. The completion of this phase at the end of January 1996 has provided visibility of the floor which was necessary for placement of storage racks and other canning equipment in the pool. It is expected that fuel baskets will now be moved from the adjacent pool to the four canning stations to commence the final critical project phase of canning the 8,000 fuel elements in late April 1996.

The Department originally estimated that it would cost $10 million to complete the canning operation in North Korea. The $10 million reprogramming request in January 1995 highlighted that there was an element of uncertainty in this estimate, especially since the United States has never collaborated with North Korea before. The $10 million initial estimate was derived in January 1995 after only 2 one-week trips to Democratic People's Republic of Korea (DPRK) with no other known benchmark for this task. It was indicated that no other similar project has ever been accomplished. The Department's closest experience in canning spent fuel had been a successful project in Taiwan, a known and open ally. There was no basis of knowledge about the technical, cultural or logistics difficulties working with and inside the DPRK. The cost estimate assumed an early project start date of February/March 1995 in order to arrest the accelerated fuel corrosion and was based on shifting early in the project to a 12-hour workday. The estimate for completion planned for a production rate of 96 canisters per month.

There have been unforeseen time delays, technical problems and cultural issues which have caused the extension of the schedule and therefore, the increase of the project costs. This undertaking has been complex and a combination of factors have been responsible for the cost increase. Unforeseen time delays were experienced as the Congress debated the original request for the $10 million reprogramming, by an inability to travel to DPRK until completion of the Kuala Lumpur talks and by the December withdrawal of the U.S. Spent Fuel Team due to Korean Peninsula Energy Development Organization's light water reactor supply talks. These delays have resulted in higher logistics and shipping costs, additional heat and cooling requirements and accumulation of additional sludge on the floor of the pool.

Technical issues have impacted the schedule adherence and the original cost estimate. These include: fuel rack design changes requested by the IAEA after design had been approved by the IAEA and DPRK and the racks had been manufactured; equipment damage due to improper operation by the North Koreans; and continuous power outages which cause disruption to planned work activities for the U.S. Spent Fuel Team.

Political and cultural issues have had significant impact on the Team's ability to control many critical work, travel and logistics aspects within the original cost estimate and schedule. This project is the first joint U.S. project in the DPRK. Overall, the DPRK cooperation has been good, but it has taken time to gain the DPRK's confidence and trust. The Team is operating in a North Korean facility and negotiates every day's work schedule and support with the facility director. The team is often not able to accomplish every work item required by the U.S. schedule. There are impacts to performing our work on a day-to-day basis at the facility, including, dependence on DPRK transportation, translation of all conversations and written protocols/instructions, the difficulty in making a change to any plan on a short notice, and many other factors which limit the U.S. team's flexibility to act unilaterally. The logistics of travel to DPRK are intricate and the visa approval process for DPRK is costly as it sometimes leaves our people stranded in Beijing, China. These and other political and cultural issues have caused schedule slip and cost increases.

The $3.6 million requested in fiscal year 1996 was anticipated for follow-on, post-canning maintenance and fuel characterization. However, because of the aforementioned time delays as well as technical and political problems, this funding has been used to continue the original spent fuel canning activity. The Department requires an additional $4.1 million in fiscal year 1996 to continue spent fuel canning from June 1996 through September 1996, and an additional $5.4 million is estimated to be required for completion of the canning work by March 1997. In addition, the post-canning activities, still required for fiscal year 1997, is estimated at $2.5 million. While future maintenance and follow-on requirements cannot be clearly defined until the conclusion of the spent fuel canning work, it is estimated that $2.5 - $5 million per year will be needed for this follow-on work from fiscal year 1998 through the removal of the spent fuel from North Korea (now estimated at 4-7 years).

The completion of DOE activities is critical to U.S. national security as well as reducing tensions in the region. The spent nuclear fuel which will be secured is estimated to hold 25-30 kilograms of plutonium capable of making 5-6 nuclear weapons.

Mr. Myers. Can you assure this Committee that this will be the final funding request?

Ms. Rohlfing. It is not possible at this time to assure the Committee that this will be the final funding request. Uncertainties in the operation still exist which could affect the ultimate cost. Also, in testimony to both the House and Senate last year, the Department noted that funding for follow-on canning maintenance will be required. This yearly cost is currently estimated at $2.5 - $5 million. These funds will be required until the fuel is ultimately removed from North Korea. The Department remains committed to completion of this effort in the most efficient and effective manner.

Mr. Myers. Is North Korea complying with the terms of the agreement?

Ms. Rohlfing. From the standpoint of the spent fuel and the freeze on their nuclear facilities, we believe that they are in full compliance.

ACTIVITIES WITH RUSSIA AND THE NEWLY INDEPENDENT STATES

Mr. Myers. Please identify all funding supporting Russia or other NIS programs in this budget. Provide funding levels for fiscal years 1995, 1996, and 1997, and identify for each year any funding for these programs provided by other federal agencies.

Ms. Rohlfing. I would be happy to provide the information on activities in Russia and the Newly Independent States for the record. The information follows:

U.S. Department of Energy
Activities with Russia and the Newly Independent States
Office of Nonproliferation and National Security
Dollars in Thousands

	FY 1995	FY 1996	FY 1997
Total Program Funding			
Export Control			
Department of Energy (DOE)	1,698.00	2107.50	3,292.50
Department of Defense (DOD)	820.00	522.00	132.00
Department of State (State)	0.00	600.00	75.00
Subtotal	2,518.00	3,229.50	3,499.50
International Safeguards			
DOE	11,050.00	00.0	0.00
DOD	66,900.00*	00.0	0.00
Subtotal	77,950.00	00.0	0.00
RERTR			
DOE	0.00	90.00	40.00
State	0.00	360.00	460.00
Subtotal	0.00	450.00	500.00
MPC&A			
DOE	0.00	68,815.00	92,637.00
DOD	0.00*	15,340.00	0.00
Subtotal	0.00	84,155.00	92,637.00

IPP			
DOE	0.00	10,000.00	15,000.00
DOD	0.00	10,000.00**	0.00
Subtotal	0.00	20,000.00**	15,000.00
Analytical Support			
DOE	2,766.00	4,013.70	3,060.80
DOD	0.00	0.00	0.00
State	0.00	0.00	0.00
Subtotal	2,766.00	4,013.70	3,060.80
TOTAL DOE	**15,514.00**	**85,026.20**	**114,030.80**
TOTAL DOD	67,760.00	25,862.00**	132.00
TOTAL State	0.00	960.00	535.00
GRAND TOTAL	83,274.00	111,848.20**	114,697.80

* In FY 1992 through FY 1995, the Department of Defense, under the Cooperative Threat Reduction Program, provided the majority of the MPC&A funding. Due to the Department of Energy's budget structure, this funding was reflected under "International Safeguards" prior to FY 1996.

** Department of Defense may provide additional $10 Million to the Industrial Partnering Program in FY 1996.

Mr. Myers. Are Nunn-Lugar funds available for any of these activities?

Ms. Rohlfing. Yes, Nunn-Lugar funds are available for some of these activities. The information follows:

Nunn-Lugar funding for Activities with Russia and the Newly Independent States Dollars in Thousands

	FY 1995	FY 1996	FY 1997
Total Nunn-Lugar Funding			
Export Control	820.00	522.00	132.00
International Safeguards	66,900.00*	0.00	0.00
MPC&A	0.00*	15,340.00	0.00
IPP	0.00	10,000.00**	0.00
TOTAL	67,720.00	25,862.00**	132.00

* In FY 1992 through FY 1995, the Department of Defense, under the Cooperative Threat Reduction Program, provided the majority of the MPC&A funding. Due to the Department of Energy's budget structure, this funding was reflected under "International Safeguards" prior to FY 1996.

** Department of Defense may provide additional $10 Million to the Industrial Partnering Program in FY 1996.

RUSSIAN REPLACEMENT POWER PROGRAM

Mr. Myers. The Congress in FY 1996 did not provide funding for the Russian replacement power program as proposed by the Administration as part of the Nuclear Energy program budget. Now we find the Department has been funding this effort at a level of $5.2 million in FY 1996 using a variety of sources including $2 million from the nonproliferation program. Please identify the source of this funding and explain why the Committee was not notified that a reprogramming of funds had occurred.

Dr. Lash. The Department provided $3 million in FY 1995 for feasibility studies. $1 million came from Nonproliferation and National Security funds and $2 million came from Nuclear Energy funds, $1 million of which was provided from excess Energy Supply R&D prior year balances. The Department conducts feasibility studies as part of its normal operations to determine whether to proceed with potential programs. Because the Russian Replacement Power evaluations were feasibility studies, funding them did not constitute a formal reprogramming. Although we did conduct an internal reprogramming to supply $1 million of prior year balances to Nuclear Energy's Policy & Management account, we acted within the Congressional guidelines for reporting this action in the Quarterly Base Table.

RUSSIAN REPLACEMENT POWER PROGRAM

Mr. Myers. Are any funds included in the nonproliferation budget for this activity in FY 1997?

Dr. Lash. The U.S. Department of Energy's FY 1997 nonproliferation budget does not include any funds specifically for the Russian program.

COST OF MPC&A PROGRAM

Mr. Myers. What is the cost of the program with Russia (former Soviet Union) for material protection, control, and accounting in fiscal years 1995, 1996, and 1997, and what is the estimated total cost and completion date of the effort?

Ms. Rohlfing. In FY 1995, the Department of Energy (DOE) provided $11.1 million for Materials Protection, Control and Acccounting (MPC&A) in the former Soviet Union (FSU). In FY 1996, the DOE is providing $70 million for MPC&A in the FSU. In FY 1997, the DOE is requesting $94.2 million for MPC&A in the FSU.

In addition, the Department of Defense provided funding through the Cooperative Threat Reduction Program in the following amounts: $66.9 million in FY 1992 - 1995 and $15.3 million in FY 1996.

In FY 1995, $40 million was spent for cooperative MPC&A efforts with Russia alone. In FY 1996, MPC&A efforts in Russia will cost an estimated $60 million. In FY 1997, MPC&A in Russia will cost an estimated $90 million. Total program costs are currently estimated at several hundred million from FY 1996 through FY 2002. Uncertainties in the total program costs include both the total number of facilities to be covered by the program and the cost per facility.

Mr. Myers. What will be the Russian (former Soviet Union) contribution to the program cost?

Ms. Rohlfing. The Russian government views MPC&A as a matter of high national security importance. There have been a number of resolutions by the President, the Russian government, and the involved Ministries aimed at modernizing and upgrading existing nuclear material protection, control, and accounting. Several laws were subsequently drafted and passed and programs of implementation have been drafted. U.S. efforts are fully integrated with the implementation of these Russian implementation plans. The Russian financial contribution is judged to be substantial, but a precise quantitative estimate is not available.

Other countries of the former Soviet Union are also committed to improving MPC&A. The amount of their contributions to the overall MPC&A effort is unknown.

Mr. Myers. Are other Federal agencies contributing funds to this effort?

Ms. Rohlfing. The Nuclear Regulatory Commission (NRC) has a role in these cooperative efforts. NRC's role includes regulatory development activities, such as licensing and inspection, program development, and related training. NRC also receives a small amount of funding from the Agency for International Development (AID).

Mr. Myers. What is the nature of the U.S. participation in this proposed program–cash, equipment, support to U.S. industry to provide services and equipment?

Ms. Rohlfing. U.S. activities in the MPC&A program include implementation of enhanced material protection, control, and accounting at numerous facilities, provision of technical support, including training, and equipment, to national authorities and individual facilities and locations, and regulatory development activities, such as licensing and inspection program development, and related training. The U.S. contracts with various companies, in the U.S. and abroad, to provide services and equipment necessary in the program. One of the goals of the program, however, is the creation of indigenous capabilities and an indigenous safeguards culture that will continue to improve FSU MPC&A after U.S. assistance finishes.

Mr. Myers. Please identify the funding and milestones for completion of each of the activities of the Reduced Enrichment Research and Test Reactor (RERTR) program.

Ms. Rohlfing. The Department of Energy is requesting $6.4 million for the overall Reduced Enrichment for Research and Test Reactors (RERTR) program for FY 1997. This program can be broken down into five main components: base RERTR program; advanced fuel; Russian cooperation program; Molybdenum-99 production from Low Enriched Uranium (LEU) and other bilateral projects.

The first category is for the base RERTR program. These activities include management, design and analyses to enable research reactor conversions worldwide. Since this work supports the overall program, it is not possible to provide precise milestones for completion for this aspect of the RERTR.

The second category of work is for advanced fuels development. This program, resumed in 1996, is to develop new, higher density low enriched uranium fuels to enable all research reactors using Highly Enriched Uranium (HEU) to switch to LEU. This activity will also develop fuel materials of particular applicability to facilitate the cooperation programs currently underway with Russia and planned for China. Milestones for completion include:

Production, irradiation, and examination of high density fuel materials;
Testing and evaluation of alternative fuel fabrication materials and techniques; and
Production, irradiation, and examination of high density fuel elements.

The Department currently has a six-year spending plan for the advanced fuels development program of $20.3 million. Since it is impossible to estimate scientific and engineering progress, this work may be completed sooner or later with appropriate reductions or increases in funding.

The third component of the RERTR program is the Russian/US cooperation effort. This portion of the RERTR program extends the RERTR nonproliferation goals to include all HEU-fueled research and test reactors design and supplied by the former Soviet Union. If successful, this effort would enable all these research reactors, both inside and out of Russia to convert to LEU fuel. Such a development would also reduce the likelihood of any future Russian sales of HEU.

The fourth component of this program is the effort to develop the means to economically produce Molybdenum-99 -- a vital medical isotope -- from LEU targets. Such a development would further reduce the demand for the use of highly enriched uranium in research reactors by developing the technology to economically produce vital medical isotopes from low enriched uranium targets. Currently, almost all Molybdenum-99 is produced from HEU targets. Milestones for the program include:

Fabrication, irradiation, and examination of LEU targets; and
Development of chemical processing techniques for LEU targets.

The final component of this important nonproliferation success story contains other bilateral cooperation efforts. Potential candidates for cooperation include China, with which the United States plans to implement a cooperation program along the lines of that currently underway with Russia, as well as South Africa, Mexico, South Korea and others.

NONPROLIFERATION RESEARCH AND DEVELOPMENT

Mr. Myers. Describe the intended use of the $10.7 million which is identified for Washington-Headquarters and the $3.2 million identified for the K-25 Site, Oak Ridge.

Ms. Rohlfing. Approximately half of the $10.7 million which is identified for Washington-Headquarters will be used in the Small Business Innovation Research (SBIR) program and the Small Business Technology Transfer Pilot Program (STTR); the other half is funding needed to respond to emerging nonproliferation requirements and technology opportunities that develop during the year and which cannot be attributed to any particular laboratory this far in advance. The $3.2 million identified for the Oak Ridge K-25 Site will support nonproliferation technology programs directed at nuclear materials accountability, hands-off detection and identification of nuclear materials, countering illicit trafficking in nuclear materials, detecting underground facilities, advances in effluent detection technologies, and adapting laboratory effluent detection technologies to field applications.

Mr. Myers. In the regional monitoring program, please provide in tabular form a breakout between seismic, hydro, atmospheric, and infrasound monitoring, as well as on-site inspection and ADP activities.

Ms. Rohlfing. The breakout of the specific technologies comprising the Comprehensive Test Ban Treaty research and development program area of the Regional Monitoring Systems program is shown in a table which I would like to insert in the record. The information follows:

COMPREHENSIVE TEST BAN TREATY
RESEARCH AND DEVELOPMENT PROGRAM
(in Millions of Dollars)

Technology	FY 1997
Seismic Monitoring	$15.0
Hydroacoustic Monitoring	2.0
Atmospheric Radionuclide Monitoring	3.0
Infrasound Monitoring	1.0
On-site Inspection	0.8
Automatic Data Processing	7.0
Total	$28.8

Mr. Myers. The narrative on advanced systems indicates part of the FY 1997 request is to "initiate new nonproliferation technology development projects." Provide additional details relative to the nature and associated total costs (FY 1997 and beyond) for these projects.

Ms. Rohlfing. The $35 million advanced systems program provides the new ideas for developing science and technology projects to: detect/prevent diversion of nuclear materials; detect indigenous nuclear weapons production programs; and monitor nuclear test ban treaties. The majority of this program is focused on developing lidar-based chemical effluent detection technologies and on developing the data processing techniques needed to process and exploit large amounts of data from new, improved sensors (turning data into information).

"New nonproliferation technology development projects" are explored at each of the DOE national laboratories covering a broad range of nonproliferation and treaty verification problems. These activities are often proof-of-concept efforts which, if proven, provide the basis for improved capabilities or innovative technological solutions to U.S. proliferation detection and treaty verification problems. Examples of the types of technologies developed include the following: micromachine sensors for effluent detection, applications of fiber optics and holographics to proliferation detection, innovative spectroscopy for proliferation detection, and smart tags and seals for fissile material. The "new nonproliferation technology development projects" referenced in the narrative on advanced systems in the FY 1997 request will be funded at $5 million in FY 1997 with outyear funding projected to remain at the same level.

ARMS CONTROL

Mr. Myers. Describe the planned activities in FY 1997 for the $19.5 million at the K-25 Site, Oak Ridge.

Ms. Rohlfing. The $19.5 million will not be spent at the K-25 Site. Rather, this amount reflects **all** activities planned for Oak Ridge (Oak Ridge National Laboratory) in FY 1997. The planned activities include the following:

- **$1.5 million** ($1.4 million + $100,000 capital equipment) will provide:

  Extensive technical support to the development of a safeguards approach for the Portsmouth Gaseious Diffusion Plant under the Excess Fissile Materials project which implements the placement of excess US weapons material under International Atomic Energy Agency (IAEA) safeguards.

  Technical leadership for the US/Latin America International Agreements

  Leadership in research and development for environmental sampling in support of the IAEA's efforts toward enhanced safeguards methods.

- **$2 million** will provide:

  Expert technical support in Oak Ridge's core technology areas (uranium enrichment, reprocessing, reactor design and nuclear weapons facbrication) to the Department's export license reviews, to multilateral export control regimes and initiatives, interagency meetings and training seminars.

  Assistance to Department of Energy (DOE) on the development and implementation of training for East European countries and former Soviet Union republics on control of sensitive nuclear technology and equipment.

  Supports preparation of informational tools on technologies of interest such as weapons components manufacturing, centrifuge, calutron, gaseous diffusion, and heavy water production.

  Preparation and maintenance of computer notebook database for the Nuclear Suppliers Group negotiations conducted by DOE and provides expert on-site technical support to the Department regarding export control negotiations and initiatives.

- **$500,000** will provide:

  Laboratory expert work on strengtheing the nuclear nonproliferation regime supporting program activities associated with establishing transparency procedures for implementation of the President's offer to place excess US fissile material under international safeguards and for characterization and disposition of fissile materials in the former Soviet Union republics.

- **$15.5 million ($11.5 million + 4 million capital equipment)** will provide:

  Oak Ridge is one of the six national laboratories that is cooperating with the states of the former Soviet Union to protect, control, and account for nuclear material. This funding provides support for cooperation and to improve nuclear material protection, control and accounting (MPC&A) under the Government to Government MPC&A program in Russia, the Ukraine, Kazakstan and with Gosatomnadzor. These activities include provision of equipment, technical advice and support, training for operators and inspectors, and other forms of support to secure and enhance material accountancy and protection for direct use nuclear materials in FSU civilian facilities. This funding also supports the Laboratory to Laboratory Program in MPC&A in Russia.

ARMS CONTROL

Mr. Myers. Why does Nuclear Proliferation Policy reflect a proposed increase of 62.6% ($5.3 million to $8.6 million)? Describe the requirement for the requested increase.

Ms. Rohlfing. The proposed FY 1997 funding level for Nuclear Proliferation Policy is needed for substantially increased regional arms control/nonproliferation interests and project activities. In the Middle East and Asian spheres particularly, we are transposing approaches and techniques learned in earlier bilateral and multilateral nonproliferation treaty/agreement and implementation regimes to issue definition, dialogue stimulation, and problem solving in regional situations involving nuclear fuel cycles, fissile materials, and weapons-related research. Specifically, the additional funds will support regional Nuclear Nonproliferation Policy analyses and activities pertaining to excess civilian plutonium management and disposition, verification, monitoring, implementation of arms control agreements and nuclear weapons free zones, and treatment of nuclear energy security issues.

The proposed $3.3 million addition for FY 1997 is actually a *net* increase of $1.4 million in that we proposed a corresponding $1.9 million reduction in the Arms Control Analytical line. We effected this by combining the Nuclear Proliferation Policy function with the Arms Control Analytical function in a single organization under common management. (These activities will be presented as a common budget line in FY 1998). This $1.4 million net addition represents a 6.5% increase for the $22.2 million combined FY 1997 program. Our goal in this functional restructuring is to continue quality support for maturing international program activities while making additional resources available to meet growing regional demands for Department of Energy national laboratory products and expert services.

Mr. Myers. Why do Treaties and Agreements increase by 63%? Provide a more detailed explanation relative to the increments of activity with associated increases/decreases.

Ms. Rohlfing. In reality, projected FY 1997 funding ($8,000,000) for activities associated with Treaties and Agreements has only increased 20.5% over FY 1996 funding ($6,640,000). A significant portion of this funding was realigned to the new Program Direction decision unit for the Office of Nonproliferation and National Security as a whole, when program decision units for subordinate offices were eliminated. Before this occurred, the FY 1997 request restored almost the original funding level for FY 1995 of $8,200,000. FY 1996 funding was approximately 20% less than FY 1995 funding. FY 1997 funding is actually 2.44% less than FY 1995 funding.

The following are examples of activities for which additional funding over FY 1996 levels is needed, although precise amounts for individual activities cannot be predicted at this time:

- Funding was decreased in FY 1996 due to Congressional elimination of Department of Energy (DOE) responsibilities under the Threshold Test Ban Treaty. This has now been taken over by negotiations which will lead to the completion of the Comprehensive Test Ban Treaty this fall. DOE responsibilities under this treaty will be significant.

- We anticipate additional circumstances, similar to Operation Sapphire involving the removal of over 500 tons of weapon-usable materials for Kazakstan, occurring during the next fiscal year, where DOE may be required to act quickly to prevent at-risk materials from falling into the wrong hands, whether rogue states or terrorist groups.

- Anticipated progress in mutual reciprocal inspections under the Safeguards, Transparency and Irreversibility effort with Russia, as well as increased inventories of excess materials being offered for International Atomic Energy Agency inspection will require additional funds to bring effective and efficient procedures into place.

- Continued technical support and personnel for United Nations Special Commission inspection efforts in Iraq, as well as other possible activities responding to urgent U.S. national security efforts involving treaty or agreement negotiations and implementation.

Mr. Myers. Provide comparative detail for the international security program for fiscal years 1996 and 1997 which allocates the funding by activity.

Ms. Rohlfing. The International Security program is composed of Spent Fuel Activities in the Democratic Peoples Republic of Korea (DPRK) and the New Independent States Industrial Partnering Program. I would be pleased to provide FY 1996 and FY 1997 funding information for these activities for the record. The information follows:

Arms Control and Nonproliferation
International Security
(Dollars in Millions)

	FY 1996	FY 1997
DPRK Fuel Canning Activities	$ 3.6	$ 5.0 ($4.968**)
Industrial Partnering Program	$ 10.0 ($9.611**)	$ 15.0 ($14.6**)
TOTAL	$ 13.6 ($13.211**)	$ 20.0 ($19.568**)

** This figure has Program Direction subtracted.

INDUSTRIAL PARTNERING PROGRAM

Mr. Myers. Provide further detail of the Industrial Partnering Program to include the significant components (and associated costs) of the program for fiscal year 1995.

Ms. Rohlfing. Initial funding of $35 million for the New Independent States Industrial Partnering Program (NIS IPP) was identified in Section 575 of the FY 1994 Foreign Appropriations Act. This funding was received by the Department of Energy from the United States Agency for International Development (USAID) in July 1994. There were no new funds appropriated in FY 1995. Because the funds were not received until July 1994, most of the $35 million was not costed until FY 1995.

Total funding received by the department in FY 1994 for the NIS IPP was $59 million. This amount consisted of the $35 million from USAID and the $24 million in industrial cost-share funds. The manner in which these funds have been spent is shown in a table which I would like o insert for the record. The information follows:

INDUSTRIAL PARTNERING PROGRAM
TOTAL FY 1994 FUNDS-OUT: (Dollars in Millions)

Funding for Projects	
Thrust I*	$20.0
Thrust II*	$36.0
Subtotal	$56.0
Project Management	$ 3.0
Total	$59.0

FY 1994 FUNDS-OUT IN FY 1995: (Dollars in Millions)

Thrust I	$16.0
Thrust II	$33.0
Subtotal	$49.0
Project Management	$ 1.4
Total	$50.4

* Thrust I = DOE laboratory to NIS institute project

**Thrust II = Projects that are cost-shared by U.S. industry

ARMS CONTROL

Mr. Myers. The narrative gives little detail relative to the specifics for the $24.1 million requested for facilities operation. Provide adequate supporting information relative to the requirements for FY 1997.

Ms. Rohlfing. The $24.1 million requested for facilities operation in FY 1997 will provide funding for the following four areas:

The majority of the funding, $23 million, is required to procure equipment in support of nuclear material protection, control and accounting efforts in the Former Soviet Union. Equipment required under the program includes physical protection equipment such as portal monitors, sensors, and access controls systems and material control and accounting equipment such as tamper indicating devices, non-destructive assay equipment, and material control and accounting workstations.

Funding of $300,000 is planned for support of Export Control Operations' Proliferation Information Network System (PINS) to purchase and install secure system servers at designated PINS sites, including DOE Headquarters; to purchase and install PINS Wide Area Network (WAN) encryption systems at each national laboratory and DOE Headquarters; and to purchase and install PINS/NN-40 shared database server. These purchases will: (1) allow continued and expanded operation within a secure environment, (2) permit DOE to meet the shortened timeframe for license reviews imposed under the recently implemented Executive Order 12981, and (3) increase our capability to share data products essential to proliferation analysis and licensing determinations.

In addition, funding of $475,000 is earmarked for the purchase of equipment in support of International Safeguards activities to include environmental monitoring and analysis equipment including mass spectometers, gamma dectectors, clean room modules, and other related equipment. For remote monitoring, large scale processors may be purchased. IAEA information management Sun Sparc stations will be purchased. For international agreements, items including advanced containment/surveillance equipment, non-destructive analysis systems and safeguards laboratory equipment will be purchased for demonstration and evaluation by our bilateral partners.

Finally, additional funding of $300,000 is intended for support to the Reduced Enrichment Research and Test Reactor (RERTR) Program to purchase equipment for advanced fuel development efforts. This equipment, including specialized rolling and milling devices, is vital to the U.S. efforts to reduce and eventually eliminate international civil commerce in highly enriched uranium. The advanced fuel work will help facilitate U.S. cooperation work with Russia and China, as well as enable the last remaining European research reactors currently unable to convert to low enriched uranium to do so.

COMPARABILITY ASSESSMENT

Mr. Myers. Does the $10.9 million comparability adjustment for FY 1996 represent the program direction transfer only, or are there other non-program direction items included?

Ms. Rohlfing. The $10.9 million adjustment represents the program direction transfer only. (U)

DEPARTMENTAL USE OF INTELLIGENCE RESOURCES

Mr. Myers. Provide detail on which Departmental elements utilize or expend the resources in this activity; i.e., national laboratories, support service contractors, M&Os, etc.

Ms. Rohlfing. The following table depicts which Departmental elements utilize or expend the resources in this activity. The table is unclassified. (U)

DOE ELEMENTS USING OR EXPENDING INTELLIGENCE RESOURCES

Description	**HQ Federal Personnel**	**Support Service Contractors**
Salaries & Benefits	X	
Travel	X	
Advisory & Assistance Services		X
Communications, Utilities, & Misc. Charges	X	
Other Services	X	
Operation & Maintenance of Equipment		X
Equipment	X	

Mr. Myers. What is the most likely threat to DOE facilities, and what is the least likely threat?

Ms. Rohlfing. The Department of Energy (DOE) uses current intelligence and other information to estimate the likelihood of potential hostile acts, but this can be misleading. Even the best of such estimates are time-sensitive and unreliable. (If US intelligence analysts had been asked the day before the Oklahoma City bombing to estimate the likelihood of such an attack, they would have said the danger is low.) Because of these uncertainties, DOE uses a **design basis threat** and a **risk assessment** methodology to design, plan, build and evaluate its security systems. We will briefly describe that process below.

Based on current estimates, the most likely threat to DOE facilities is believed to be theft of government property, sensitive information and/or technology by a disgruntled employee, white collar criminal, or intelligence collector working for a foreign government or private entity. The least likely threat is believed to be a full-scale armed assault by foreign or domestic terrorists attempting to steal a nuclear weapon, component or special nuclear materials (SNM).

Understanding that it is difficult to predict events reliably, it is important to note that robust security measures are a **deterrent.** Terrorists generally avoid well-defended targets and seek out the easy, unprotected ones. By **assuming** such acts in our risk assessment and planning process, we assure that we will have robust security. Finally, in calculating risk we also consider the **consequences** of acts. While the theft of a nuclear weapon is unlikely, its consequences, if it did occur, would be very grave indeed. Protective measures in such severe cases are driven by the desire to avoid these grave consequences.

Mr. Myers. When were DOE threat guidelines last revised ?

Ms. Rohlfing. A revised version of DOE "threat guidelines," (*Design Basis Threat for Department of Energy Programs and Facilities*) was issued on January 4, 1996 and contained changes that resulted from a detailed review of several key elements begun in mid-1995. The changes included the addition of a quantitative planning standard for large vehicle bombs and the addition of lethal chemical and biological weapons to the capabilities of certain adversaries.

DECLASSIFICATION

Mr. Myers. Please describe the current effort to declassify information, including the funding for each year and milestones.

Ms. Rohlfing. The Department is currently performing declassification reviews on two distinctly different groups of documents: those classified by the Atomic Energy Act and those classified by Executive Order.

The first group has been our primary target under the Secretary's Openness Initiative. We have been conducting systematic reviews at the National Archives and Records Administration and within the DOE History Division of historically significant records from the Atomic Energy Commission and other predecessor organizations. This group of reviews also includes the reviews in support of Freedom of Information Act requests, litigation involving the Department, reviews of Congressional testimony, patent applications, and a variety of other miscellaneous services.

The second group of reviews escalated in importance in April 1995, when President Clinton issued Executive Order 12958. This order concerns National Security Information, and for the first time, establishes an automatic declassification provision for permanently valuable records more than 25-years old. The order establishes a requirement to declassify 15 percent of such records by October 1996 with similar targets for subsequent years and completing a 100 percent review by October 2000. The primary impact on the Department of Energy is that, while the information on nuclear weapons design and operational use is not governed by the Executive Order, there is a substantial volume of nuclear weapons design information that has been mismarked and/or improperly stored over the years with National Security Information. It is now a formidable task to identify and properly protect this still highly sensitive information to prevent its inadvertent release. This nuclear weapons design information is contained in the Department's files and the files of as many as 57 other Governmental agencies, many of which do not have the expertise necessary to properly identify it.

Funding that has been provided for our document review programs was $2,563,966 in FY 1995 (before the Executive Order); $6,410,000 in FY 1996 (of which $2,600,000 is for the Executive Order); and $9.350,000 in FY 1997 (with $5,500,000 for the Executive Order). At these funding levels, the Department will meet the Executive Order requirement to declassify 15 percent of its National Security Information documents twenty-five years or older in both FY 1996 and FY 1997 while continuing other necessary declassification activities.

Mr. Myers. How is the Executive Order to declassify information being implemented?

Ms. Rohlfing. The declassification of information under the Executive Order is being implemented by reviewing only National Security Information contained in the records under the direct control of the Department; i.e., those records in the DOE History Division and at the National Archives and Records Administration. The Department will spend $2.6 million in FY 1996 to implement the Executive Order and meet the requirement to declassify 15 percent of its

National Security Documents twenty-five years or older by October 1996. Similarly, in FY 1997 the Department will spend 20 percent of these documents. The Implementation plan provides for a 100 percent review by October 2000.

The DOE Field Elements are not as significantly affected since most of their records are primarily composed of Restricted Data and Formerly Restricted Data (i.e., nuclear weapons design and operational information) rather than National Security Information.

We will not be able to provide any assistance to other agencies, the Presidential Libraries, Regional Archives, or Federal Records Centers. We are working with the other agencies to obtain their support in holding files suspected of containing nuclear weapon design information until we can review it, but it is uncertain when we will be able to do this work. .

Mr. Myers. What are the costs by year to implement this directive?

Ms. Rohlfing. The funding for the Executive Order reviews is $2,600,000 in FY 1996 and $5,500,000. in FY 1997.

SAFEGUARDS AND SECURITY

Mr. Myers. Do other program organizations in the Department maintain separate offices for safeguards and security activities? If so, please explain why these organizations need to maintain separate safeguards and security staff.

Ms. Rohlfing. Yes, the Office of the Assistant Secretary for Defense Programs and Environmental Management each maintain a small (3-5) safeguards and security (S&S) staff. Prior to the Department's Strategic Alignment Initiative, each had a substantially larger staff. The residual staff serves to assist in programmatic S&S budget matters, policy review and coordination, and in coordination with the Office of Nonproliferation and National Security, provides assistance to field sites regarding programmatic S&S issues and expenditures.

DECLASSIFICATION

Mr. Myers. In fiscal years 1994 and 1995, how many pages were classified and how many declassified by the Department of Energy?

Ms. Rohlfing. In FY 1994, the Department of Energy classified 1,592,470 pages and declassified 213,800 pages. In FY 1995, the Department classified 1,438,140 pages and declassified 337,210 pages.

In addition, it should be noted that significant resources were used to review documents and determine their unclassified status. In FY 1994, 3,436,590 pages were reviewed and confirmed to be unclassified. In FY 1995 that number was 3,509,280.

SAFEGUARDS AND SECURITY CROSSCUT

Mr. Myers. Provide a crosscut by location of all safeguards and security funding throughout the Department for fiscal years 1995, 1996 and 1997.

Ms. Rohlfing. The crosscut by location of all safeguards and security funding throughout the Department for fiscal years 1995, 1996 and 1997 is shown in a table which I would like to insert in the record. Please see the attached table.

DEPARTMENT OF ENERGY
Safeguards and Security Crosscut Estimates
FY 1997 Congressional Budget Submission
BY FACILITY
(Budget Authority In Thousands)

Organization/Facility	FY 1995 Col. of FY 97 CB	FY 1996 Col. of FY 97 CB	FY 1997 Col. of FY 97 CB
Albuquerque			
Albuquerque Ops Office	16,610	17,274	15,816
Kansas City Plant (Allied Signal)	7,029	7,124	7,469
Central Training Academy	9,200	8,799	8,463
Grand Junction Project Office	954	908	936
Los Alamos National Lab.	60,220	64,944	66,786
Pantex	44,206	44,644	42,219
Pinellas	3,292	808	678
Sandia - Albuquerque	31,534	29,179	23,531
Sandia - California	5,188	5,208	4,829
Sandia - Tonopah	1,676	1,788	1,705
Transportation Safeguards Division	78,000	90,157	99,858
Waste Isolation Pilot Plant	1,957	2,074	2,154
Total, Albuquerque	259,866	272,907	274,444
Rocky Flats Environmental Tech Site	65,716	75,444	74,038
Chicago			
Chicago Operations Office	1,893	1,550	1,598
Ames Laboratory	196	207	214
Argonne National Laboratory	12,186	12,568	12,865
Brookhaven National Laboratory	6,446	7,668	7,193
Fermi National Laboratory	2,588	2,869	2,746
New Brunswick Laboratory	4,295	4,295	3,907
Princeton Plasma Physics Lab	854	890	949
Total, Chicago	28,458	30,047	29,472
Golden Field Office	893	896	965
Idaho	29,968	36,316	32,858
Nevada	32,440	33,483	33,746
Oakland			
Oakland Ops. Office	4,086	4,890	4,671
Lawrence Berkeley National Lab.	1,048	2,092	1,135
Lawrence Livermore National Lab.	39,825	37,695	38,227
Stanford Linear Accelerator	868	868	872
Total, Oakland	45,827	45,545	44,905
Oak Ridge			
Oak Ridge Operations Office	11,047	7,027	11,274
Central	1,110	806	806
Continuous Beam Accelerator Fac.	502	515	530
K-25 Site	8,762	8,416	8,416
OR Institute for Science & Education	1,016	1,250	1,105
Oak Ridge National Lab.	7,875	7,559	7,559
Paducah Gaseous Diff. Plant	3,081	3,175	3,268
Portsmouth Gaseous Diff. Plt	9,328	4,048	4,204
Superconducting Super Collider			0
Y-12 Plant	39,234	38,832	40,836
Total, Oak Ridge	81,955	71,628	77,998

DEPARTMENT OF ENERGY
Safeguards and Security Crosscut Estimates
FY 1997 Congressional Budget Submission
BY FACILITY
(Budget Authority in Thousands)

Organization/Facility	FY 1995 Col. of FY 97 CB	FY 1996 Col. of FY 97 CB	FY 1997 Col. of FY 97 CB
Ohio Field Office			
Fernald Env Rest Mgmt Corp (FERMC)	2,734	2,558	2,038
Mound	9,278	5,903	5,479
West Valley	1,337	1,288	1,338
Total, Ohio Field Office	13,349	9,749	8,855
Office of Scientific & Tech Info	813	393	369
Richland	43,869	41,149	41,658
Savannah River	98,035	97,160	85,327
Western Area Power Administration	760	797	621
Bartlesville Project Office	278	290	304
Morgantown Energy Tech. Center	595	816	635
Naval Petroleum & Oil Shale Res.	1,269	1,180	1,260
Pittsburgh Energy Tech. Center	675	875	935
Strategic Petroleum Reserve	14,958	14,773	13,900
Pittsburgh Naval Reactors	11,118	9,390	11,273
Schenectady Naval Reactors	11,539	11,461	12,080
Headquarters	60,294	60,150	62,461
TOTAL DOE Safeguards & Security	**$802,675**	**$814,449**	**$808,104**

SAFEGUARDS AND SECURITY CROSSCUT

Mr. Myers. For the record, please provide the details of each site's costs for safeguards and security. Include in this detail a table showing the size of guard forces and expenditures for guard forces by location for fiscal years 1995, 1996 and 1997.

Ms. Rohlfing. The details of each site's costs for safeguards and security, by reporting category, for fiscal years 1995, 1996 and 1997 are shown in tables which I would like to insert in the record The size of guard forces and expenditures for guard forces by location for fiscal years 1995, 1996 and 1997 is shown in a table which I would like to insert in the record. Please see the attached tables.

DEPARTMENT OF ENERGY
SAFEGUARDS AND SECURITY ESTIMATES
FY 1997 Column of FY 1997 Congressional Request
Operating Expenses - Activity Summaries
(In Thousands)

	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
	ALBUQUERQUE OPERATIONS OFFICE									
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0
GB	Stockpile Management and Support	0	0	0	0	826	0	0	0	826
GB	Program Direction	4,939	520	97	0	239	3,903	0	0	9,698
GH	Security Investigations	0	0	0	0	0	5,275	0	0	5,275
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Albuquerque	4,939	520	97	0	1,065	9,178	0	0	15,799
	ALLIED (KANSAS CITY)									
EW	Env Restor & Waste Mgmt-Defense	2	62	3	0	10	3	0	0	80
GB	Stockpile Management and Support	26	5,740	282	0	1,091	250	0	0	7,389
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Allied	28	5,802	285	0	1,101	253	0	0	7,469
	CENTRAL TRAINING ACADEMY									
GD	Nuclear Safeguards & Security	8,400	0	0	0	0	0	0	0	8,400
	TOTAL Central Training Academy	8,400	0	0	0	0	0	0	0	8,400
	GRAND JUNCTION PROJECT OFFICE									
EW	Env Restor & Waste Mgmt-Defense	53	127	3	0	62	17	2	0	264
EX	Env Res & Waste Mgmt - Nondefense	136	322	7	0	157	44	6	0	672
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Grand Junction Proj Office	189	449	10	0	219	61	8	0	936
	LOS ALAMOS NATIONAL LABORATORY									
AT	Magnetic Fusion	28	161	14	6	25	20	44	0	298
EW	Env Restor & Waste Mgmt-Defense	1,259	6,968	596	271	1,095	835	1,906	0	12,930
GA	Fissile Material Disposition	0	0	0	0	0	0	0	0	0
GB	Weapons Activities (RD&T)	1,660	15,173	786	359	1,443	1,100	2,515	0	23,036
GB	Stockpile Management and Support	513	10,070	244	111	446	340	776	0	12,500
GC	Nonproliferation & Verification R&D	319	1,773	151	69	278	210	485	0	3,285
GD	Nuclear Safeguards and Security	0	0	0	0	0	0	0	6,440	6,440
GE	Materials Support	41	347	20	9	35	25	61	0	538
GJ	Arms Control & Nonproliferation	93	516	44	19	81	60	141	0	954
KB	Nuclear Physics	221	1,227	104	47	193	145	740	0	2,677
KC	Basic Energy Sciences	116	644	56	25	101	75	176	0	1,193
KP	Biological & Environ Research	128	709	60	27	112	85	194	0	1,315
	All Other B & R's	0	1,012	0	0	0	0	0	0	1,012
	TOTAL Los Alamos	4,378	38,600	2,075	943	3,809	2,895	7,038	6,440	66,178

DEPARTMENT OF ENERGY
SAFEGUARDS AND SECURITY ESTIMATES
FY 1997 Column of FY 1997 Congressional Request
Capital Equipment and Construction - Activity Summaries
(In Thousands)

SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
ALBUQUERQUE OPERATIONS OFFICE												
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	0
GB	Stockpile Management and Support	0	12	0	5	0	0	17	0	0	0	843
GB	Program Direction	0	0	0	0	0	0	0	0	0	0	9,698
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	5,275
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Albuquerque..............................	0	12	0	5	0	0	17	0	0	0	15,816
ALLIED (KANSAS CITY)												
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	80
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	7,389
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Allied......................	0	0	0	0	0	0	0	0	0	0	7,469
CENTRAL TRAINING ACADEMY												
GD	Nuclear Safeguards & Security	63	0	0	0	0	0	63	0	0	0	8,463
	TOTAL Central Training Academy.....	63	0	0	0	0	0	63	0	0	0	8,463
GRAND JUNCTION PROJECT OFFICE												
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	264
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	672
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Grand Junction Proj. Office....	0	0	0	0	0	0	0	0	0	0	936
LOS ALAMOS NATIONAL LABORATORY												
AT	Magnetic Fusion	0	0	0	0	0	0	0	0	0	0	298
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	12,930
GA	Fissile Material Disposition	0	0	0	0	0	0	0	0	0	0	0
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	23,036
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	12,500
GC	Nonproliferation & Verification R&D	0	0	0	0	0	0	0	0	0	0	3,285
GD	Nuclear Safeguards and Security	0	0	0	0	0	608	608	0	0	0	7,048
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	538
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	0	0	0	0	954
KB	Nuclear Physics	0	0	0	0	0	0	0	0	0	0	2,677
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	1,193
KP	Biological & Environ. Research	0	0	0	0	0	0	0	0	0	0	1,315
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	1,012
	TOTAL Los Alamos..	0	0	0	0	0	608	608	0	0	0	66,786

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DEPARTMENT OF ENERGY
SAFEGUARDS AND SECURITY ESTIMATES
FY 1997 Column of FY 1997 Congressional Request
Operating Expenses - Activity Summaries
(In Thousands)

SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect. Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
PANTEX										
EW	Env Restor & Waste Mgmt-Defense	0	55	0	0	0	0	0	0	55
GB	Stockpile Management	0	19,511	2,015	0	1,518	7,449	1,707	0	32,200
	All Other B & R's...........	0	225	0	0	0	0	0	0	225
	TOTAL Pantex.........	0	19,791	2,015	0	1,518	7,449	1,707	0	32,480
PINELLAS										
EW	Env Restor & Waste Mgmt-Defense	16	179	7	0	13	7	0	0	222
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0
GG	Worker and Community Trans. Prog.	31	370	13	0	28	14	0	0	456
	All Other B & R's.....	0	0	0	0	0	0	0	0	0
	TOTAL Pinellas...........	47	549	20	0	41	21	0	0	678
SANDIA NATIONAL LAB - ALBUQUERQUE										
GA	Fissile Material Disposition	0	0	0	0	0	0	0	0	0
GB	Stockpile Management and Support	55	452	56	33	130	45	104	927	1,802
GB	Weapons Activities (RD&T)	371	3,025	378	215	873	304	694	3,359	9,219
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	7,246	7,246
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	0	0	0
	All Other B & R's............. ..	250	2,031	253	146	586	207	466	176	4,115
	TOTAL Sandia - Albuquerque	676	5,508	687	394	1,589	556	1,264	11,708	22,382
SANDIA NATIONAL LAB - CALIFORNIA										
GB	Stockpile Management and Support	15	232	60	6	23	27	22	8	393
GB	Weapons Activities (RD&T)	104	1,564	406	38	154	171	150	46	2,633
	All Other B & R's..........	70	1,052	272	26	103	114	100	31	1,768
	TOTAL Sandia - California.... . .	189	2,848	738	70	280	312	272	85	4,794
SANDIA NATIONAL LAB - TONOPAH TEST RANGE										
GB	Stockpile Management and Support	0	84	19	0	0	0	12	0	115
GB	Weapons Activities (RD&T)	0	625	138	0	0	0	94	0	857
	All Other B & R's... ...	0	420	93	0	0	0	63	0	576
	TOTAL Sandia - Tonopah.	0	1,129	250	0	0	0	169	0	1,548
	TOTAL SANDIA........... . .	865	9,485	1,675	464	1,869	868	1,705	11,793	28,724

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DEPARTMENT OF ENERGY
SAFEGUARDS AND SECURITY ESTIMATES
FY 1997 Column of FY 1997 Congressional Request
Capital Equipment and Construction - Activity Summaries
(In Thousands)

SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
PANTEX												
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	55
GB	Stockpile Management	0	0	0	0	0	0	0	0	9,739	9,739	41,939
	All Other B & R's.................	0	0	0	0	0	0	0	0	0	0	225
	TOTAL Pantex...........................	0	0	0	0	0	0	0	0	9,739	9,739	42,219
PINELLAS												
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	222
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	0
GG	Worker and Community Trans. Prog.	0	0	0	0	0	0	0	0	0	0	456
	All Other B & R's....	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Pinellas..........................	0	0	0	0	0	0	0	0	0	0	678
SANDIA NATIONAL LAB - ALBUQUERQUE												
GA	Fissile Material Disposition	0	0	0	0	0	0	0	0	0	0	0
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	1,802
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	9,219
GD	Nuclear Safeguards & Security	0	551	0	0	0	130	681	0	0	0	7,927
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	0	0	0	0	0
	All Other B & R's	0	233	125	75	0	35	468	0	0	0	4,583
	TOTAL Sandia - Albuquerque............	0	784	125	75	0	165	1,149	0	0	0	23,531
SANDIA NATIONAL LAB - CALIFORNIA												
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	393
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	2,633
	All Other B & R's.....	0	35	0	0	0	0	35	0	0	0	1,803
	TOTAL Sandia - California.............	0	35	0	0	0	0	35	0	0	0	4,829
SANDIA NATIONAL LAB - TONOPAH TEST RANGE												
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	115
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	857
	All Other B & R's......	0	32	125	0	0	0	157	0	0	0	733
	TOTAL Sandia - Tonopah	0	32	125	0	0	0	157	0	0	0	1,705
	TOTAL SANDIA	0	851	250	75	0	165	1,341	0	0	0	30,065

DEPARTMENT OF ENERGY
SAFEGUARDS AND SECURITY ESTIMATES
FY 1997 Column of FY 1997 Congressional Request
Operating Expenses - Activity Summaries
(In Thousands)

SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
TRANSPORTATION SAFEGUARDS DIVISION										
GB	Stockpile Management and Support	0	0	0	96,616	0	0	0	0	96,616
	All Other B & R's................	0	0	0	0	0	0	0	0	0
	TOTAL Transportation Safeguards Div....	0	0	0	96,616	0	0	0	0	96,616
WASTE ISOLATION PILOT PLANT (WIPP)										
EW-31	Waste Management - Defense	239	1,635	104	0	72	104	0	0	2,154
	All Other B & R's................	0	0	0	0	0	0	0	0	0
	TOTAL WIPP....................	239	1,635	104	0	72	104	0	0	2,154
GRAND TOTAL, ALBUQUERQUE OPS. OFFICE. . .		19,085	76,831	6,281	98,023	9,694	20,829	10,458	18,233	259,434

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DEPARTMENT OF ENERGY
SAFEGUARDS AND SECURITY ESTIMATES
FY 1997 Column of FY 1997 Congressional Request
Capital Equipment and Construction - Activity Summaries
(In Thousands)

SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
TRANSPORTATION SAFEGUARDS DIVISION											
GB Stockpile Management and Support	0	0	2,042	0	0	0	2,042	1,200	0	1,200	99,858
All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
TOTAL Transportation Safeguards Div....	0	0	2,042	0	0	0	2,042	1,200	0	1,200	99,858
WASTE ISOLATION PILOT PLANT (WIPP)											
EW-31 Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	2,154
All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
TOTAL WIPP....................	0	0	0	0	0	0	0	0	0	0	2,154
GRAND TOTAL, ALBUQUERQUE OPS. OFFICE....	63	863	2,292	80	0	773	4,071	1,200	9,739	10,939	274,444

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DEPARTMENT OF ENERGY
SAFEGUARDS AND SECURITY ESTIMATES
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Operating Expenses - Activity Summaries
(In Thousands)

SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account	Total Research & Develop	TOTAL OPERATING EXPENSES
ROCKY FLATS PLANT										
EW	Env Restor & Waste Mgmt-Defense	2,093	10,071	5,403	68	1,475	1,396	3,494	50	24,050
GB	Stockpile Management and Support	1,867	23,085	1,042	0	268	230	6,767	144	33,403
GH	Security Investigations	0	0	0	0	0	900	0	0	900
	All Other B & R's....	0	0	0	0	0	0	0	0	0
GRAND TOTAL, ROCKY FLATS		3,960	33,156	6,445	68	1,743	2,526	10,261	194	58,353

DEPARTMENT OF ENERGY
SAFEGUARDS AND SECURITY ESTIMATES
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Capital Equipment and Construction - Activity Summaries
(In Thousands)

	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans- portation	Total Infor- mation Security	Total Personnel Security	Total Material Control & Account	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC- TION	TOTAL SAFEGUARDS & SECURITY
ROCKY FLATS PLANT												
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	225	225	0	15,460	15,460	39,735
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	33,403
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	900
	All Other B & R's........... . .	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL, ROCKY FLATS...		0	0	0	0	0	225	225	0	15,460	15,460	74,038

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(In Thousands)

SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account	Total Research & Develop.	TOTAL OPERATING EXPENSES
CHICAGO OPERATIONS OFFICE										
GD	Nuclear Safeguards & Security	1,398	0	0	0	0	0	0	0	1,398
GH	Security Investigations	0	0	0	0	0	200	0	0	200
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Chicago	1,398	0	0	0	0	200	0	0	1,598
AMES LABORATORY										
EW-40	Technology Development	1	20	1	0	4	0	0	0	26
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0
KC	Basic Energy Sciences	4	107	10	0	23	0	4	0	148
	All Other B & R's	1	29	3	0	6	0	1	0	40
	TOTAL Ames	6	156	14	0	33	0	5	0	214
ARGONNE NATIONAL LABORATORY - EAST										
AF	Nuclear Energy R&D	66	746	60	0	48	109	178	0	1,207
AT	Magnetic Fusion	3	45	3	0	3	7	11	0	72
EW	Env Restor & Waste Mgmt-Defense	23	249	21	0	16	36	59	0	404
EX	Env Res & Waste Mgmt - Nondefense	18	215	16	0	14	32	52	0	347
GD	Nuclear Safeguards & Security	0	0	0	0	0	103	0	0	103
KA	High Energy Physics	5	58	4	0	4	8	14	0	93
KB	Nuclear Physics	8	102	8	0	6	14	24	0	162
KC	Basic Energy Sciences	57	655	52	0	42	97	156	0	1,059
KP	Biological & Environ Research	8	90	8	0	6	14	21	0	147
	All Other B & R's	91	1,029	81	0	66	152	245	0	1,664
	Subtotal Argonne - East	279	3,189	253	0	205	572	760	0	5,258
ARGONNE NATIONAL LABORATORY - WEST										
AF	Nuclear Energy R&D	210	4,253	549	134	268	176	911	0	6,501
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	80	80
EW	Env Restor & Waste Mgmt-Defense	4	59	13	3	7	5	22	0	113
EX	Env Res & Waste Mgmt - Nondefense	3	46	11	3	5	4	17	0	89
	All Other B & R's	38	430	96	23	48	31	158	0	824
	Subtotal Argonne - West	255	4,788	669	163	328	216	1,108	80	7,607
	TOTAL ANL EAST & WEST	534	7,977	922	163	533	788	1,868	80	12,865

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SAFEGUARDS AND SECURITY ESTIMATES
FY 1997 Column of FY 1997 Congressional Request
Capital Equipment and Construction - Activity Summaries
(In Thousands)

SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Physical Security	Total Transportation	Total Information Security	Total Personnel Security	Total Material Control & Account	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr	TOTAL CONSTRUCTION	TOTAL SAFEGUARDS & SECURITY
CHICAGO OPERATIONS OFFICE												
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	1,398
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	200
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Chicago	0	0	0	0	0	0	0	0	0	0	1,598
AMES LABORATORY												
EW-40	Technology Development	0	0	0	0	0	0	0	0	0	0	26
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	0
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	148
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	40
	TOTAL Ames	0	0	0	0	0	0	0	0	0	0	214
ARGONNE NATIONAL LABORATORY - EAST												
AF	Nuclear Energy R&D	0	0	0	0	0	0	0	0	0	0	1,207
AT	Magnetic Fusion	0	0	0	0	0	0	0	0	0	0	72
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	404
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	347
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	103
KA	High Energy Physics	0	0	0	0	0	0	0	0	0	0	93
KB	Nuclear Physics	0	0	0	0	0	0	0	0	0	0	162
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	1,059
KP	Biological & Environ Research	0	0	0	0	0	0	0	0	0	0	147
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	1,664
	Subtotal Argonne - East	0	0	0	0	0	0	0	0	0	0	5,258
ARGONNE NATIONAL LABORATORY - WEST												
AF	Nuclear Energy R&D	0	0	0	0	0	0	0	0	0	0	6,501
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	80
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	113
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	89
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	824
	Subtotal Argonne - West	0	0	0	0	0	0	0	0	0	0	7,607
	TOTAL ANL EAST & WEST	0	0	0	0	0	0	0	0	0	0	12,865

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account	Total Research & Develop	TOTAL OPERATING EXPENSES
BROOKHAVEN NATIONAL LABORATORY										
EW	Env Restor & Waste Mgmt-Defense	0	68	0	0	0	0	0	0	68
EX	Env Res & Waste Mgmt - Nondefense	11	130	0	0	0	0	13	0	154
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	425	425
KA	High Energy Physics	106	789	72	0	30	10	87	0	1,094
KB	Nuclear Physics	18	220	10	0	0	0	20	0	268
KC	Basic Energy Sciences	110	1,796	73	0	31	11	170	0	2,191
KP	Biological & Environ Research	55	393	30	0	15	0	36	0	529
	All Other B & R's	290	1,350	193	0	125	79	193	0	2,230
	TOTAL Brookhaven National Lab	590	4,746	378	0	201	100	519	425	6,959
FERMI NATIONAL LABORATORY										
KA	High Energy Physics	137	2,016	167	0	235	0	24	0	2,579
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Fermi National Laboratory	137	2,016	167	0	235	0	24	0	2,579
NEW BRUNSWICK LABORATORY										
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	3,700	0	3,700
	TOTAL New Brunswick Laboratory	0	0	0	0	0	0	3,700	0	3,700
PRINCETON PLASMA PHYSICS LABORATORY										
AT	Magnetic Fusion	306	579	0	0	0	0	0	0	885
EX	Env Res & Waste Mgmt - Nondefense	18	32	0	0	0	0	0	0	50
	All Other B & R's	4	10	0	0	0	0	0	0	14
	TOTAL Princeton Plasma Phys Lab	328	621	0	0	0	0	0	0	949
GRAND TOTAL, CHICAGO OPS OFFICE		2,993	15 516	1,481	163	1,002	1,088	6,116	505	28,864

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
BROOKHAVEN NATIONAL LABORATORY												
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	68
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	154
GD	Nuclear Safeguards & Security	0	0	0	0	0	25	25	0	0	0	450
KA	High Energy Physics	0	9	0	0	0	0	9	200	0	200	1,303
KB	Nuclear Physics	0	0	0	0	0	0	0	0	0	0	268
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	2,191
KP	Biological & Environ. Research	0	0	0	0	0	0	0	0	0	0	529
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	2,230
	TOTAL Brookhaven National Lab	0	9	0	0	0	25	34	200	0	200	7,193
FERMI NATIONAL LABORATORY												
KA	High Energy Physics	59	108	0	0	0	0	167	0	0	0	2,746
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Fermi National Laboratory	59	108	0	0	0	0	167	0	0	0	2,746
NEW BRUNSWICK LABORATORY												
GD	Nuclear Safeguards & Security	0	0	0	0	0	207	207	0	0	0	3,907
	TOTAL New Brunswick Laboratory	0	0	0	0	0	207	207	0	0	0	3,907
PRINCETON PLASMA PHYSICS LABORATORY												
AT	Magnetic Fusion	0	0	0	0	0	0	0	0	0	0	885
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	50
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	14
	TOTAL Princeton Plasma Phys Lab	0	0	0	0	0	0	0	0	0	0	949
GRAND TOTAL, CHICAGO OPS. OFFICE		59	117	0	0	0	232	408	200	0	200	29,472

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(In Thousands)

SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account	Total Research & Develop	TOTAL OPERATING EXPENSES
GOLDEN FIELD OFFICE (NREL)										
EB	Solar Energy	66	496	204	0	119	20	0	0	905
KC	Basic Energy Sciences	1	12	6	0	2	1	0	0	22
GRAND TOTAL, GOLDEN FIELD OFFICE		67	508	210	0	121	21	0	0	927

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Physical Security	Total Transportation	Total Information Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUCTION	TOTAL SAFEGUARDS & SECURITY
GOLDEN FIELD OFFICE (NREL)												
EB	Solar Energy	0	36	0	0	0	0	36	0	0	0	941
KC	Basic Energy Sciences	0	2	0	0	0	0	2	0	0	0	24
GRAND TOTAL, GOLDEN FIELD OFFICE		0	38	0	0	0	0	38	0	0	0	965

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account	Total Research & Develop	TOTAL OPERATING EXPENSES
IDAHO OPERATIONS OFFICE										
EW-70	Facility Transition & Management	2,017	0	122	0	128	886	24	0	3,177
GH	Security Investigations	0	0	0	0	0	400	0	0	400
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Idaho Ops Office	2,017	0	122	0	128	1,286	24	0	3,577
LOCKHEED TECHNOLOGIES COMPANY-IDAHO										
AJ	Naval Reactors	56	2,564	144	0	60	68	34	0	2,926
EW	Env Restor & Waste Mgmt-Defense	419	6,511	1,065	0	440	507	258	0	9,200
GB	Weapons Activities (RD&T)	4	47	11	0	5	6	2	200	275
GD	Nuclear Safeguards & Security	827	0	0	0	0	0	0	0	827
GE	Materials Support	11	2,942	2,730	0	614	960	888	225	8,370
	All Other B & R's	85	1,512	213	0	89	102	52	0	2,053
	TOTAL Lockheed-Idaho	1,402	13,576	4,163	0	1,208	1,643	1,234	425	23,651
GRAND TOTAL, IDAHO OPS OFFICE		3,419	13,576	4,285	0	1,336	2,929	1,258	425	27,228

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ITE/FACILITY/CONTRACTORS		Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
DAHO OPERATIONS OFFICE												
W-70	Facility Transition & Management	0	100	0	0	740	0	840	0	0	0	4,017
H	Security Investigations	0	0	0	0	0	0	0	0	0	0	400
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Idaho Ops. Office......	0	100	0	0	740	0	840	0	0	0	4,417
OCKHEED TECHNOLOGIES COMPANY-IDAHO												
J	Naval Reactors	0	0	0	0	0	0	0	0	0	0	2,926
W	Env Restor & Waste Mgmt-Defense	0	0	0	0	145	0	145	0	4,645	4,645	13,990
B	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	275
D	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	827
E	Materials Support	0	0	0	0	0	0	0	0	0	0	8,370
	All Other B & R's....	0	0	0	0	0	0	0	0	0	0	2,053
	TOTAL Lockheed-Idaho.....	0	0	0	0	145	0	145	0	4,645	4,645	28,441
RAND TOTAL, IDAHO OPS. OFFICE.....		0	100	0	0	885	0	985	0	4,645	4,645	32,858

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account	Total Research & Develop	TOTAL OPERATING EXPENSES
NEVADA OPERATIONS OFFICE										
GB	Weapons Activities (RD&T)	3,810	0	0	0	0	0	0	0	3,810
GH	Security Investigations	0	0	0	0	0	600	0	0	600
NT	Intelligence	0	0	1,400	0	0	0	0	0	1,400
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Nevada	3,810	0	1,400	0	0	600	0	0	5,810
BECHTEL NEVADA										
DB	Waste Management Systems	396	1,643	0	0	106	181	0	0	2,326
EW	Waste Management - Defense	113	390	40	0	65	70	0	0	678
GB	Weapons Activities (RD&T)	3,634	12,595	4,872	220	1,166	1,465	0	230	24,182
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	150	150
GJ	Arms Control & Nonproliferation	0	0	1	0	1	0	0	0	2
NT	Intelligence	12	0	26	0	23	10	0	0	71
	All Other B & R's	82	(39)	175	0	182	127	0	0	527
	TOTAL BECHTEL NEVADA	4,237	14,589	5,114	220	1,543	1,853	0	380	27,936
GRAND TOTAL, NEVADA OPS OFFICE		8,047	14,589	6,514	220	1,543	2,453	0	380	33,746

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
NEVADA OPERATIONS OFFICE												
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	3,810
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	600
NT	Intelligence	0	0	0	0	0	0	0	0	0	0	1,400
	All Other B & R's............	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Nevada	0	0	0	0	0	0	0	0	0	0	5,810
BECHTEL NEVADA												
DB	Waste Management Systems	0	0	0	0	0	0	0	0	0	0	2,326
EW	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	678
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	24,182
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	150
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	0	0	0	0	2
NT	Intelligence	0	0	0	0	0	0	0	0	0	0	71
	All Other B & R's....	0	0	0	0	0	0	0	0	0	0	527
	TOTAL BECHTEL NEVADA .	0	0	0	0	0	0	0	0	0	0	27,936
GRAND TOTAL, NEVADA OPS OFFICE		0	0	0	0	0	0	0	0	0	0	33,746

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account	Total Research & Develop	TOTAL OPERATING EXPENSES
	OAKLAND OPERATIONS OFFICE									
GB	Weapons Activities (RD&T)	698	0	44	0	429	1,437	27	0	2,635
GH	Security Investigations	0	0	0	0	0	1,700	0	0	1,700
WM-60	General Admin Contractual Serv	0	0	309	0	0	0	0	0	309
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Oakland Ops Office	698	0	353	0	429	3,137	27	0	4,644
	LAWRENCE BERKELEY NATIONAL LAB (LBNL)									
EC	Buildings Sector - EERE	3	77	7	0	0	0	0	0	87
EX	Env Res & Waste Mgmt - Nondefense	3	126	10	0	0	0	0	0	139
KA	High Energy Physics	5	138	11	0	0	0	0	0	154
KB	Nuclear Physics	5	69	6	0	0	0	0	0	80
KC	Basic Energy Sciences	13	329	27	0	0	0	0	0	369
KP	Biological & Environmental Res	5	123	10	0	0	0	0	0	138
	All Other B & R's	6	150	12	0	0	0	0	0	168
	TOTAL Lawrence Berkeley Lab	40	1,012	83	0	0	0	0	0	1,135
	LAWRENCE LIVERMORE NATIONAL LAB (LLNL)									
AT	Magnetic Fusion	87	362	206	0	95	90	75	0	915
DB	Waste Management System	64	272	155	0	71	67	56	0	685
EW	Env Restor & Waste Mgmt-Defense	213	889	509	0	233	220	185	0	2,249
GA	Fissile Material Disposition	0	0	0	0	0	0	0	0	0
GB	Weapons Activities (RD&T)	1,481	6,185	3,536	0	1,616	1,529	3,454	0	17,801
GC	Nonproliferation & Verification R&D	159	657	377	0	172	164	136	0	1,665
GD	Nuclear Safeguards & Security	168	0	0	0	0	0	0	2 981	3,149
GH	Security Investigations	0	0	0	0	0	2,000	0	0	2,000
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	2,600	0	2,600
KC	Basic Energy Sciences	94	395	225	0	103	98	82	0	997
KP	Biological & Environmental Res	77	322	184	0	84	79	67	0	813
	All Other B & R's	466	1,947	1,112	0	508	482	403	0	4,918
	TOTAL Lawrence Livermore Lab	2,809	11 029	6,304	0	2,882	4,729	7,058	2,981	37,792
	STANFORD LINEAR ACCELERATOR									
EX	Env Res & Waste Mgmt - Nondefense	0	31	0	0	0	0	0	0	31
KA	High Energy Physics	0	683	0	0	0	0	0	0	683
KC	Basic Energy Sciences	0	137	0	0	0	0	0	0	137
	All Other B & R's	0	21	0	0	0	0	0	0	21
	TOTAL Stanford Linear Accelerator	0	872	0	0	0	0	0	0	872
	GRAND TOTAL, OAKLAND OPERATIONS OFFICE	3,547	12,913	6,740	0	3,311	7,866	7,085	2,981	44,443

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
OAKLAND OPERATIONS OFFICE												
GB	Weapons Activities (RD&T)	0	0	0	27	0	0	27	0	0	0	2,662
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	1,700
WM-60	General Admin Contractual Serv.	0	0	0	0	0	0	0	0	0	0	309
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Oakland Ops. Office	0	0	0	27	0	0	27	0	0	0	4,671
LAWRENCE BERKELEY NATIONAL LAB (LBNL)												
EC	Buildings Sector - EERE	0	0	0	0	0	0	0	0	0	0	87
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	139
KA	High Energy Physics	0	0	0	0	0	0	0	0	0	0	154
KB	Nuclear Physics	0	0	0	0	0	0	0	0	0	0	80
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	369
KP	Biological & Environmental Res	0	0	0	0	0	0	0	0	0	0	138
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	168
	TOTAL Lawrence Berkeley Lab	0	0	0	0	0	0	0	0	0	0	1,135
LAWRENCE LIVERMORE NATIONAL LAB (LLNL)												
AT	Magnetic Fusion	0	11	0	0	0	0	11	0	0	0	926
DB	Waste Management System	0	8	0	0	0	0	8	0	0	0	693
EW	Env Restor & Waste Mgmt-Defense	1	27	0	0	0	0	28	0	0	0	2,277
GA	Fissile Material Disposition	0	0	0	0	0	0	0	0	0	0	0
GB	Weapons Activities (RD&T)	5	189	0	0	0	0	194	0	0	0	17,995
GC	Nonproliferation & Verification R&D	1	20	0	0	0	0	21	0	0	0	1,686
GD	Nuclear Safeguards & Security	90	0	0	0	0	0	90	0	0	0	3,239
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	2,000
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	0	0	0	0	2,600
KC	Basic Energy Sciences	0	12	0	0	0	0	12	0	0	0	1,009
KP	Biological & Environmental Res	0	10	0	0	0	0	10	0	0	0	823
	All Other B & R's	2	59	0	0	0	0	61	0	0	0	4,979
	TOTAL Lawrence Livermore Lab	99	336	0	0	0	0	435	0	0	0	38,227
STANFORD LINEAR ACCELERATOR												
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	31
KA	High Energy Physics	0	0	0	0	0	0	0	0	0	0	683
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	137
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	21
	TOTAL Stanford Linear Accelerator	0	0	0	0	0	0	0	0	0	0	872
GRAND TOTAL, OAKLAND OPERATIONS OFFICE		99	336	0	27	0	0	462	0	0	0	44,905

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account	Total Research & Develop.	TOTAL OPERATING EXPENSES
OAK RIDGE OPERATIONS OFFICE										
AF 99	Oak Ridge Landlord (NE)	0	2,575	45	0	718	0	0	0	3,338
GB	Stockpile Management	2,897	553	0	0	415	786	0	0	4,651
GH	Security Investigations	0	0	0	0	0	2,800	0	0	2,800
WA	General Admin - Program Direction	0	0	0	0	0	293	0	0	293
	All Other B & R's	0	0	0	0	0	147	0	0	147
	TOTAL Oak Ridge Ops Office	2,897	3,128	45	0	1,133	4,026	0	0	11,229
CONTINUOUS ELECTRON BEAM ACCELER FACIL										
KB	Nuclear Physics	0	430	0	0	50	0	0	0	480
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Continuous Electron Facil	0	430	0	0	50	0	0	0	480
K-25 SITE										
EW-20	Environmental Restoration - Defense	276	4,430	272	51	702	482	388	0	6,601
EW-31	Waste Management - Defense	88	595	52	13	233	138	49	0	1,168
	All Other B & R's	47	326	29	14	128	76	27	0	647
	TOTAL K-25 Site	411	5,351	353	78	1,063	696	464	0	8,416
CENTRAL										
GD	Nuclear Safeguards and Security	213	0	0	0	0	0	0	500	713
	All Other B&R's	0	0	0	0	0	0	0	0	0
	TOTAL Central.	213	0	0	0	0	0	0	500	713
OR INSTITUTE FOR SCIENCE & EDUCATION (ORISE)										
GD	Nuclear Safeguards & Security	0	0	0	0	0	563	0	0	563
GH	Security Investigations	0	0	0	0	0	385	0	0	385
KG	Multi-Prgm Enrgy Lab - Fac Sup	0	0	0	0	0	0	0	0	0
	All Other B & R's	0	127	0	0	0	30	0	0	157
	TOTAL ORISE	0	127	0	0	0	978	0	0	1,105

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
OAK RIDGE OPERATIONS OFFICE												
AF 99	Oak Ridge Landlord (NE)	0	45	0	0	0	0	45	0	0	0	3,383
GB	Stockpile Management	0	0	0	0	0	0	0	0	0	0	4,651
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	2,800
WA	General Admin. - Program Direction	0	0	0	0	0	0	0	0	0	0	293
	All Other B & R's.	0	0	0	0	0	0	0	0	0	0	147
	TOTAL Oak Ridge Ops. Office	0	45	0	0	0	0	45	0	0	0	11,274
CONTINUOUS ELECTRON BEAM ACCELER FACIL.												
KB	Nuclear Physics	0	0	0	50	0	0	50	0	0	0	530
	All Other B & R's.	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Continuous Electron Facil.	0	0	0	50	0	0	50	0	0	0	530
K-25 SITE												
EW-20	Environmental Restoration - Defense	0	0	0	0	0	0	0	0	0	0	6,601
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	1,168
	All Other B & R's.	0	0	0	0	0	0	0	0	0	0	647
	TOTAL K-25 Site	0	0	0	0	0	0	0	0	0	0	8,416
CENTRAL												
GD	Nuclear Safeguards and Security	93	0	0	0	0	0	93	0	0	0	806
	All Other B&R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Central	93	0	0	0	0	0	93	0	0	0	806
OR INSTITUTE FOR SCIENCE & EDUCATION (ORISE)												
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	563
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	385
KG	Multi-Prgm Enrgy Lab - Fac Sup	0	0	0	0	0	0	0	0	0	0	0
	All Other B & R's.	0	0	0	0	0	0	0	0	0	0	157
	TOTAL ORISE	0	0	0	0	0	0	0	0	0	0	1,105

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account	Total Research & Develop	TOTAL OPERATING EXPENSES
OAK RIDGE NATIONAL LABORATORY (ORNL)										
AF	Nuclear Energy Research & Develop	24	132	18	0	22	39	10	0	245
AK	Electric Energy Systems	24	132	18	0	22	39	10	0	245
AT	Magnetic Fusion	41	232	32	1	36	67	16	0	425
EE	Transportation Sector	41	232	32	1	36	67	16	0	425
EW-20	Environmental Restoration - Defense	50	280	37	1	44	82	19	0	513
EW-31	Waste Management - Defense	65	367	51	1	59	109	26	0	678
EW-40	Technology Development	42	245	32	1	38	68	17	0	443
EX-20	Environmental Restoration - Nondef	42	245	32	1	38	68	17	0	443
EX-31	Waste Management - Nondefense	24	132	18	0	22	39	10	0	245
KC	Basic Energy Sciences	120	642	87	2	105	190	46	0	1,192
KE	Advanced Neutron Source	24	132	18	0	22	39	10	0	245
KP	Biological & Environ Research	41	232	32	1	36	67	16	0	425
	All Other B & R's	215	1,079	150	4	180	328	79	0	2,035
	TOTAL Oak Ridge National Lab	753	4,082	557	13	660	1,202	292	0	7,559
PADUCAH GASEOUS DIFFUSION PLANT										
CD	Uranium Programs	105	313	149	0	328	327	0	0	1,222
EU-20	Uranium Enrichment Decont & Decom	271	731	348	0	348	348	0	0	2,046
	TOTAL Paducah Gaseous Diff Plant	376	1,044	497	0	676	675	0	0	3,268
PORTSMOUTH GASEOUS DIFFUSION PLANT										
CD	Uranium Programs	0	0	0	0	0	0	0	0	0
EU-20	Uranium Enrichment Decont & Decom	255	2,886	300	0	166	241	202	0	4,050
	All Other B&R's	0	154	0	0	0	0	0	0	154
	TOTAL Portsmouth Gas Diff Plant	255	3,040	300	0	166	241	202	0	4,204
Y-12 PLANT										
EW-20	Environmental Restoration - Defense	60	181	67	1	76	90	64	0	539
EW-31	Waste Management - Defense	57	178	65	1	72	85	59	0	517
GB	Stockpile Management and Support	636	20,227	5,023	102	2,836	975	6,661	0	36,460
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	2,084	2,084
GE	Materials Support	12	398	98	2	58	18	130	0	716
	All Other B & R's	54	165	58	2	67	79	55	0	480
	TOTAL Y-12 Plant	819	21,149	5,311	108	3,109	1,247	6,969	2,084	40,796
GRAND TOTAL, OAK RIDGE OPS OFFICE		5,724	38,351	7,063	199	6,857	9,065	7,927	2,584	77,770

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OAK RIDGE NATIONAL LABORATORY (ORNL)												
AF	Nuclear Energy Research & Develop.	0	0	0	0	0	0	0	0	0	0	245
AK	Electric Energy Systems	0	0	0	0	0	0	0	0	0	0	245
AT	Magnetic Fusion	0	0	0	0	0	0	0	0	0	0	425
EE	Transportation Sector	0	0	0	0	0	0	0	0	0	0	425
EW-20	Environmental Restoration - Defense	0	0	0	0	0	0	0	0	0	0	513
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	678
EW-40	Technology Development	0	0	0	0	0	0	0	0	0	0	443
EX-20	Environmental Restoration - Nondef	0	0	0	0	0	0	0	0	0	0	443
EX-31	Waste Management - Nondefense	0	0	0	0	0	0	0	0	0	0	245
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	1,192
KE	Advanced Neutron Source	0	0	0	0	0	0	0	0	0	0	245
KP	Biological & Environ. Research	0	0	0	0	0	0	0	0	0	0	425
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	2,035
	TOTAL Oak Ridge National Lab	0	0	0	0	0	0	0	0	0	0	7,559
PADUCAH GASEOUS DIFFUSION PLANT												
CD	Uranium Programs	0	0	0	0	0	0	0	0	0	0	1,222
EU-20	Uranium Enrichment Decont. & Decom.	0	0	0	0	0	0	0	0	0	0	2,046
	TOTAL Paducah Gaseous Diff. Plant	0	0	0	0	0	0	0	0	0	0	3,268
PORTSMOUTH GASEOUS DIFFUSION PLANT												
CD	Uranium Programs	0	0	0	0	0	0	0	0	0	0	0
EU-20	Uranium Enrichment Decont. & Decom	0	0	0	0	0	0	0	0	0	0	4,050
	All Other B&R's	0	0	0	0	0	0	0	0	0	0	154
	TOTAL Portsmouth Gas. Diff. Plant	0	0	0	0	0	0	0	0	0	0	4,204
Y-12 PLANT												
EW-20	Environmental Restoration - Defense	0	0	0	0	0	0	0	0	0	0	539
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	517
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	36,460
GD	Nuclear Safeguards & Security	40	0	0	0	0	0	40	0	0	0	2,124
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	716
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	480
	TOTAL Y-12 Plant	40	0	0	0	0	0	40	0	0	0	40,836
GRAND TOTAL, OAK RIDGE OPS OFFICE		133	45	0	50	0	0	228	0	0	0	77,998

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account	Total Research & Develop	TOTAL OPERATING EXPENSES
OHIO FIELD OFFICE										
FERMC (Fernald Env Rest Manag Corp)										
EW	Env Restor & Waste Mgmt-Defense	0	1,482	0	0	0	0	556	0	2,038
GE	Materials Support	0	0	0	0	0	0	0	0	0
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL FERMC	0	1,482	0	0	0	0	556	0	2,038
MOUND LABORATORY (DAYTON)										
EW	Env Restor & Waste Mgmt-Defense	371	2,123	901	0	414	231	561	0	4,601
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	810	810
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Mound	371	2,123	901	0	414	231	561	810	5,411
WEST VALLEY										
EX-33	West Valley Demonstration Project	315	988	35	0	0	0	0	0	1,338
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL West Valley	315	988	35	0	0	0	0	0	1,338
GRAND TOTAL, OHIO FIELD OFFICE		686	4,593	936	0	414	231	1,117	810	8,787

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
	OHIO FIELD OFFICE											
	FERMC (Fernald Env. Rest. Manag. Corp.)											
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	2,038
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	0
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL FERMC	0	0	0	0	0	0	0	0	0	0	2,038
	MOUND LABORATORY (DAYTON)											
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	4,601
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	0
GD	Nuclear Safeguards & Security	68	0	0	0	0	0	68	0	0	0	878
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Mound	68	0	0	0	0	0	68	0	0	0	5,479
	WEST VALLEY											
EX-33	West Valley Demonstration Project	0	0	0	0	0	0	0	0	0	0	1,338
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL West Valley	0	0	0	0	0	0	0	0	0	0	1,338
	GRAND TOTAL, OHIO FIELD OFFICE	68	0	0	0	0	0	68	0	0	0	8,855

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account	Total Research & Develop	TOTAL OPERATING EXPENSES
OFFICE OF SCIENTIFIC & TECHNICAL INFO										
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0
LA	Technical Infor Mgmt Program	25	21	62	0	253	8	0	0	369
	All Other B & R's	0	0	0	0	0	0	0	0	0
GRAND TOTAL, OFF SCE & TECH INFO		25	21	62	0	253	8	0	0	369

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
OFFICE OF SCIENTIFIC & TECHNICAL INFO.												
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	0
LA	Technical Infor Mgmt Program	0	0	0	0	0	0	0	0	0	0	369
	All Other B & R's. ...	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL, OFF. SCE. & TECH INFO		0	0	0	0	0	0	0	0	0	0	369

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
RICHLAND OPERATIONS OFFICE										
AF	Nuclear Energy R&D	6	24	3	0	3	8	1	0	45
EC	Buildings Sector	18	12	18	0	10	8	9	0	75
ED	Industrial Sector	12	8	12	0	7	6	6	0	51
EE	Transportation Sector	11	7	11	0	6	5	5	0	45
EW-20	Environmental Restoration	22	15	24	0	13	11	11	0	96
EW-31	Waste Management - Defense	1,297	9,253	2,084	0	437	481	1,019	0	14,571
EW-40	Technology Development	121	482	57	0	61	163	27	0	911
EW-50	Transportation Management	26	106	12	0	13	36	5	0	198
EW-70	Facility Transition & Management, Defense	4,166	47	1,039	0	2,575	0	1,535	0	9,362
EX-31	Waste Management - Nondefense	23	16	24	0	13	11	11	0	98
EX-70	Facility Transition & Management, Nondef	138	935	693	0	0	0	154	0	1,920
GC	Nonproliferation & Verification R&D	33	22	34	0	19	16	17	0	141
GD	Nuclear Safeguards & Security	970	0	0	0	1,152	0	0	0	2,122
GE	Materials Support	141	7,957	1,378	80	0	0	504	0	10,060
GH	Security Investigations	0	0	0	0	0	800	0	0	800
HA	Environment, Safety & Health	0	0	0	0	0	0	0	0	0
KC	Basic Energy Sciences	26	18	27	0	14	13	13	0	111
KP	Biological & Environ. Research	79	53	81	0	45	37	39	0	334
KU	ER Lab Technology Transfer	26	18	27	0	14	13	13	0	111
	All Other B & R's	100	254	71	0	52	97	33	0	607
	TOTAL Richland Operations Office	7,215	19,227	5,595	80	4,434	1,705	3,402	0	41,658

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RICHLAND OPERATIONS OFFICE												
AF	Nuclear Energy R&D	0	0	0	0	0	0	0	0	0	0	45
EC	Buildings Sector	0	0	0	0	0	0	0	0	0	0	75
ED	Industrial Sector	0	0	0	0	0	0	0	0	0	0	51
EE	Transportation Sector	0	0	0	0	0	0	0	0	0	0	45
EW-20	Environmental Restoration	0	0	0	0	0	0	0	0	0	0	96
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	14,571
EW-40	Technology Development	0	0	0	0	0	0	0	0	0	0	911
EW-50	Transportation Management	0	0	0	0	0	0	0	0	0	0	198
EW-70	Facility Transition & Management, Defense	0	0	0	0	0	0	0	0	0	0	9,362
EX-31	Waste Management - Nondefense	0	0	0	0	0	0	0	0	0	0	98
EX-70	Facility Transition & Management, Nondef	0	0	0	0	0	0	0	0	0	0	1,920
GC	Nonproliferation & Verification R&D	0	0	0	0	0	0	0	0	0	0	141
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	2,122
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	10,060
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	800
HA	Environment, Safety & Health	0	0	0	0	0	0	0	0	0	0	0
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	111
KP	Biological & Environ. Research	0	0	0	0	0	0	0	0	0	0	334
KU	ER Lab Technology Transfer	0	0	0	0	0	0	0	0	0	0	111
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	607
	TOTAL Richland Operations Office	0	0	0	0	0	0	0	0	0	0	41,658

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
SAVANNAH RIVER OPERATIONS OFFICE										
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0
EW-70	Landlord	5,930	0	0	0	0	61	1,200	0	7,191
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0
GE	Materials Support	0	0	0	0	0	0	0	0	0
GH	Security Investigations	0	0	0	0	0	2,000	0	0	2,000
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Savannah River	5,930	0	0	0	0	2,061	1,200	0	9,191
WACKENHUT SERVICES INC										
EW-31	Waste Management - Defense	261	633	86	0	9	11	0	0	1,000
EW-70	Landlord	13,565	32,892	4,478	0	486	579	0	0	52,000
GB	Stockpile Management and Support	1,121	2,719	370	0	40	48	0	0	4,298
GE	Materials Support	0	0	0	0	0	0	0	0	0
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Wackenhut Services Inc	14,947	36,244	4,934	0	535	638	0	0	57,298
WESTINGHOUSE SAVANNAH RIVER										
EW-31	Waste Management - Defense	492	288	3,488	72	649	830	757	123	6,699
EW-70	Landlord	666	390	4,726	98	880	1,124	1,026	167	9,077
GB	Stockpile Management and Support	138	80	967	20	180	231	210	35	1,861
GE	Materials Support	0	0	0	0	0	0	0	0	0
	All Other B & R's	38	22	260	5	49	61	57	9	501
	TOTAL Westinghouse Savannah Rv	1,334	780	9,441	195	1,758	2,246	2,050	334	18,138
GRAND TOTAL, SAVANNAH RIVER		22,211	37,024	14,375	195	2,293	4,945	3,250	334	84,627

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SAVANNAH RIVER OPERATIONS OFFICE												
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	0
EW-70	Landlord	0	0	0	0	0	0	0	0	0	0	7,191
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	0
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	0
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	2,000
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Savannah River	0	0	0	0	0	0	0	0	0	0	9,191
WACKENHUT SERVICES INC												
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	1,000
EW-70	Landlord	0	0	0	0	0	0	0	0	0	0	52,000
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	4,298
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	0
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Wackenhut Services Inc	0	0	0	0	0	0	0	0	0	0	57,298
WESTINGHOUSE SAVANNAH RIVER												
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	6,699
EW-70	Landlord	0	300	0	0	0	0	300	400	0	400	9,777
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	1,861
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	0
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	501
	TOTAL Westinghouse Savannah Rv	0	300	0	0	0	0	300	400	0	400	18,838
GRAND TOTAL, SAVANNAH RIVER		0	300	0	0	0	0	300	400	0	400	85,327

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(In Thousands)

SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop	TOTAL OPERATING EXPENSES
WESTERN AREA POWER ADMIN (WAPA)										
CF	Power Marketing	184	85	275	0	37	40	0	0	621
GRAND TOTAL, WAPA		184	85	275	0	37	40	0	0	621
BARTLESVILLE PROJECT OFFICE										
AN	Energy Tech Ctr Prog Dir	189	0	76	0	30	9	0	0	304
	All Other B & R's	0	0	0	0	0	0	0	0	0
GRAND TOTAL, BARTLESVILLE		189	0	76	0	30	9	0	0	304
MORGANTOWN ENERGY TECH CENTER (METC)										
AN	Energy Tech Ctr Prog Dir	20	555	0	0	60	0	0	0	635
	All Other B & R's	0	0	0	0	0	0	0	0	0
GRAND TOTAL, METC		20	555	0	0	60	0	0	0	635
PITTSBURGH ENERGY TECHN CENTER (PETC)										
AN	Energy Tech Ctr Prog Dir	30	620	20	0	10	5	0	0	685
	All Other B & R's	0	0	0	0	0	0	0	0	0
GRAND TOTAL, PETC		30	620	20	0	10	5	0	0	685
NAVAL PETROLEUM AND OIL SHALE RESERVES										
CB	Naval Petroleum & Oil Shale Res	0	1,251	9	0	0	0	0	0	1,260
	All Other B & R's	0	0	0	0	0	0	0	0	0
GRAND TOTAL, NAVAL PETRO & O. S. RES		0	1,251	9	0	0	0	0	0	1,260
STRATEGIC PETROLEUM RESERVES (SPRO)										
SA	Strategic Petroleum Reserve	1,420	12,349	0	0	0	131	0	0	13,900
GRAND TOTAL, SPRO		1,420	12,349	0	0	0	131	0	0	13,900

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans- portation	Total Infor- mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC- TION	TOTAL SAFEGUARDS & SECURITY
	WESTERN AREA POWER ADMIN. (WAPA)											
CF	Power Marketing	0	0	0	0	0	0	0	0	0	0	621
	GRAND TOTAL, WAPA	0	0	0	0	0	0	0	0	0	0	621
	BARTLESVILLE PROJECT OFFICE											
AN	Energy Tech Ctr Prog Dir	0	0	0	0	0	0	0	0	0	0	304
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	GRAND TOTAL, BARTLESVILLE	0	0	0	0	0	0	0	0	0	0	304
	MORGANTOWN ENERGY TECH CENTER (METC)											
AN	Energy Tech Ctr Prog Dir	0	0TC)	0	0	0	0	0	0	0	0	635
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	GRAND TOTAL, METC	0	0	0	0	0	0	0	0	0	0	635
	PITTSBURGH ENERGY TECHN. CENTER (PETC)											
AN	Energy Tech Ctr Prog. Dir.	0	0	0	0	0	0	0	250	0	250	935
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	GRAND TOTAL, PETC	0	0	0	0	0	0	0	250	0	250	935
	NAVAL PETROLEUM AND OIL SHALE RESERVES											
CB	Naval Petroleum & Oil Shale Res.	0	0	0	0	0	0	0	0	0	0	1,260
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	GRAND TOTAL, NAVAL PETRO & O S RES	0	0	0	0	0	0	0	0	0	0	1,260
	STRATEGIC PETROLEUM RESERVES (SPRO)											
SA	Strategic Petroleum Reserve	0	0	0	0	0	0	0	0	0	0	13,900
	GRAND TOTAL, SPRO	0	0	0	0	0	0	0	0	0	0	13,900

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect. Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop	TOTAL OPERATING EXPENSES
PITTSBURGH NAVAL REACTORS (PNR)										
AJ	Naval Reactors	269	6,431	138	7	534	55	941	1,098	9,473
GH	Security Investigations	0	0	0	0	0	1,100	0	0	1,100
GRAND TOTAL, PNR		269	6,431	138	7	534	1,155	941	1,098	10,573
SCHENECTADY NAVAL REACTORS (SNR)										
AJ	Naval Reactors	626	5,479	3,161	464	699	348	653	0	11,430
GH	Security Investigations	0	0	0	0	0	500	0	0	500
GRAND TOTAL, SNR		626	5,479	3,161	464	699	848	653	0	11,930
HEADQUARTERS										
AD	Fossil Energy Program Direction	110	0	0	0	0	0	0	0	110
GB0506	Emergency Management Div (ND)	20	0	75	0	75	0	0	0	170
GD	Nuclear Safeguards & Security	18,024	8,900	4,120	0	20,453	0	0	0	51,497
GH	Security Investigations	0	0	0	0	0	3,340	0	0	3,340
HS	Security Evaluations	5 000	0	0	0	0	0	0	0	5,000
NB	Emergency Preparedness	0	0	0	0	0	0	0	0	0
NS	Nuclear Safety Oversight	23	0	5	0	12	0	15	0	55
NT	Intelligence	115	0	29	0	288	201	0	0	633
WA-50	General Admin Program Direction	0	0	0	0	0	0	0	0	0
WM-10	General Admin Contractual Serv	19	0	0	0	0	0	0	0	19
	All Other B & R's (GJ)	75	0	0	0	190	40	0	0	305
GRAND TOTAL, HEADQUARTERS		23,386	8,900	4,229	0	21,018	3,581	15	0	61,129
GRAND TOTAL, DEPARTMENT OF ENERGY		103,103	301,975	67,895	99,419	55,389	59,435	52,483	27,544	767,243

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Physical Security	Total Transportation	Total Information Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUCTION	TOTAL SAFEGUARDS & SECURITY
PITTSBURGH NAVAL REACTORS (PNR)												
AJ	Naval Reactors	0	700	0	0	0	0	700	0	0	0	10,173
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	1,100
GRAND TOTAL, PNR		0	700	0	0	0	0	700	0	0	0	11,273
SCHENECTADY NAVAL REACTORS (SNR)												
AJ	Naval Reactors	0	150	0	0	0	0	150	0	0	0	11,580
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	500
GRAND TOTAL, SNR		0	150	0	0	0	0	150	0	0	0	12,080
HEADQUARTERS												
AD	Fossil Energy Program Direction	0	0	0	0	0	0	0	0	0	0	110
GB0506	Emergency Management Div (ND)	0	0	0	0	0	0	0	0	0	0	170
GD	Nuclear Safeguards & Security	692	500	0	140	0	0	1,332	0	0	0	52,829
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	3,340
HS	Security Evaluations	0	0	0	0	0	0	0	0	0	0	5,000
NB	Emergency Preparedness	0	0	0	0	0	0	0	0	0	0	0
NS	Nuclear Safety Oversight	0	0	0	0	0	0	0	0	0	0	55
NT	Intelligence	0	0	0	0	0	0	0	0	0	0	633
WA-50	General Admin Program Direction	0	0	0	0	0	0	0	0	0	0	0
WM-10	General Admin Contractual Serv	0	0	0	0	0	0	0	0	0	0	19
	All Other B & R's (GJ)	0	0	0	0	0	0	0	0	0	0	305
GRAND TOTAL, HEADQUARTERS		692	500	0	140	0	0	1,332	0	0	0	62,461
GRAND TOTAL, DEPARTMENT OF ENERGY		1,114	3,149	2,292	297	885	1,230	8,967	2,050	29,844	31,894	808,104

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U S DEPARTMENT OF ENERGY
Safeguards & Security Crosscut Estimates
PROTECTIVE FORCES LEVELS and OPERATING ESTIMATES [1]

	FY 1995		FY 1996		FY 1997	
FACILITY	Total PF Personnel	Estimate ($000)	Total PF Personnel	Estimate ($000)	Total PF Personnel	Estimate ($000)
Albuquerque	1,308.8	$71,051	1,250.8	$74,442	1,222.8	$76,831
Chicago	270.0	14,393	235.0	14,969	226.0	15,516
Headquarters	167.0	9,254	150.0	8,629	150.0	8,900
Idaho	238.0	14,932	216.0	13,178	216.0	13,576
Nevada	214.0	14,187	210.0	14,350	210.0	14,589
Oakland	255.5	12,788	239.5	12,551	238.5	12,913
Oak Ridge	535.0	35,149	534.0	34,426	534.0	38,351
Ohio	184.0	6,463	151.0	4,788	119.0	4,593
Richland	200.0	19,612	200.0	19,195	200.0	19,227
Rocky Flats	386.0	36,741	386.0	33,512	373.0	33,156
Savannah River	800.0	40,704	790.0	42,909	604.0	37,024
Strategic Petroleum Res	243.0	13,463	237.0	13,222	237.0	12,349
Pittsburgh Naval Reactor [2]	241.0	6,078	241.0	6,243	241.0	6,431
Schenectady Naval Reactor [2]	160.0	5,063	138.0	5,034	138.0	5,479
TOTALS	5,202.3	$299,878	4,978.3	$297,448	4,709.3	$298,935

NOTES:

1. Protective force estimates include such elements as salaries, wages, benefits, materials, supplies, management, and training.
2. The naval reactor facilities do not currently report personnel estimates. The figures displayed are based on prior year reporting.

Sources: Protective Force Strength Report (3/29/96), as amended; FY 1997 Congressional Safeguards & Security Crosscut Report

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
	ALBUQUERQUE OPERATIONS OFFICE									
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0
GB	Stockpile Management and Support	0	0	0	0	755	0	0	0	755
GB	Program Direction	4,773	506	94	0	310	3,748	0	0	9,431
GH	Security Investigations	0	0	0	0	0	6,977	0	0	6,977
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Albuquerque	4,773	506	94	0	1,065	10,725	0	0	17,163
	ALLIED (KANSAS CITY)									
EW	Env Restor & Waste Mgmt-Defense	2	60	3	0	9	2	0	0	76
GB	Stockpile Management and Support	25	5,477	269	0	1,039	238	0	0	7,048
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Allied	27	5,537	272	0	1,048	240	0	0	7,124
	CENTRAL TRAINING ACADEMY									
GD	Nuclear Safeguards & Security	8,736	0	0	0	0	0	0	0	8,736
	TOTAL Central Training Academy	8,736	0	0	0	0	0	0	0	8,736
	GRAND JUNCTION PROJECT OFFICE									
EW	Env Restor & Waste Mgmt-Defense	42	100	2	0	49	16	2	0	211
EX	Env Res & Waste Mgmt - Nondefense	141	335	8	0	164	43	6	0	697
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Grand Junction Proj Office	183	435	10	0	213	59	8	0	908
	LOS ALAMOS NATIONAL LABORATORY									
AT	Magnetic Fusion	28	156	14	6	24	20	43	0	291
EW	Env Restor & Waste Mgmt-Defense	1,212	6,711	574	266	1,054	805	1,835	0	12,457
GA	Fissile Material Disposition	0	0	0	0	0	0	0	375	375
GB	Weapons Activities (RD&T)	1,601	14,124	757	350	1,391	1,060	2,422	0	21,705
GB	Stockpile Management and Support	526	9,678	249	115	457	350	795	0	12,170
GC	Nonproliferation & Verification R&D	309	1,709	146	68	269	205	468	0	3,174
GD	Nuclear Safeguards and Security	0	0	0	0	0	0	0	7,021	7,021
GE	Materials Support	40	325	19	8	35	25	60	0	512
GJ	Arms Control & Nonproliferation	90	498	41	19	78	60	136	0	922
KB	Nuclear Physics	214	1,181	101	46	186	140	728	0	2,596
KC	Basic Energy Sciences	112	622	54	24	97	75	170	0	1,154
KP	Biological & Environ Research	124	684	59	26	108	80	187	0	1,268
	All Other B & R's	0	891	0	0	0	0	0	0	891
	TOTAL Los Alamos	4,256	36,579	2,014	928	3,699	2,820	6,844	7,396	64,536

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
	ALBUQUERQUE OPERATIONS OFFICE											
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	0
GB	Stockpile Management and Support	0	106	0	5	0	0	111	0	0	0	866
GB	Program Direction	0	0	0	0	0	0	0	0	0	0	9,431
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	6,977
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Albuquerque............................ ..	0	106	0	5	0	0	111	0	0	0	17,274
	ALLIED (KANSAS CITY)											
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	76
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	7,048
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Allied......................	0	0	0	0	0	0	0	0	0	0	7,124
	CENTRAL TRAINING ACADEMY											
GD	Nuclear Safeguards & Security	63	0	0	0	0	0	63	0	0	0	8,799
	TOTAL Central Training Academy.....	63	0	0	0	0	0	63	0	0	0	8,799
	GRAND JUNCTION PROJECT OFFICE											
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	211
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	697
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Grand Junction Proj. Office....	0	0	0	0	0	0	0	0	0	0	908
	LOS ALAMOS NATIONAL LABORATORY											
AT	Magnetic Fusion	0	0	0	0	0	0	0	0	0	0	291
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	12,457
GA	Fissile Material Disposition	0	0	0	0	0	0	0	0	0	0	375
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	21,705
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	12,170
GC	Nonproliferation & Verification R&D	0	0	0	0	0	0	0	0	0	0	3,174
GD	Nuclear Safeguards and Security	0	0	0	0	0	408	408	0	0	0	7,429
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	512
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	0	0	0	0	922
KB	Nuclear Physics	0	0	0	0	0	0	0	0	0	0	2,596
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	1,154
KP	Biological & Environ. Research	0	0	0	0	0	0	0	0	0	0	1,268
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	891
	TOTAL Los Alamos........	0	0	0	0	0	408	408	0	0	0	64,944

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PANTEX										
EW	Env Restor & Waste Mgmt-Defense	0	60	0	0	0	0	0	0	60
GB	Stockpile Management	0	18,655	1,940	0	1,430	7,332	1,613	0	30,970
	All Other B & R's................	0	214	0	0	0	0	0	0	214
	TOTAL Pantex..........	0	18,929	1,940	0	1,430	7,332	1,613	0	31,244
PINELLAS										
EW	Env Restor & Waste Mgmt-Defense	15	203	8	0	23	11	0	0	260
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0
GG	Worker and Community Trans. Prog.	30	422	17	0	50	29	0	0	548
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Pinellas	45	625	25	0	73	40	0	0	808
SANDIA NATIONAL LAB - ALBUQUERQUE										
GA	Fissile Material Disposition	0	0	0	0	0	0	0	1,280	1,280
GB	Stockpile Management and Support	40	342	43	24	98	34	77	1,226	1,884
GB	Weapons Activities (RD&T)	396	3,391	418	239	970	336	767	7,384	13,901
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	6,500	6,500
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	0	0	0
	All Other B & R's	267	2,282	281	161	651	225	515	194	4,576
	TOTAL Sandia - Albuquerque	703	6,015	742	424	1,719	595	1,359	16,584	28,141
SANDIA NATIONAL LAB - CALIFORNIA										
GB	Stockpile Management and Support	11	174	46	4	17	20	17	6	295
GB	Weapons Activities (RD&T)	112	1,732	453	43	170	194	168	52	2,924
	All Other B & R's	75	1,164	304	29	114	129	113	35	1,963
	TOTAL Sandia - California	198	3,070	803	76	301	343	298	93	5,182
SANDIA NATIONAL LAB - TONOPAH TEST RANGE										
GB	Stockpile Management and Support	0	65	15	0	0	0	11	0	91
GB	Weapons Activities (RD&T)	0	667	154	0	0	0	106	0	927
	All Other B & R's	0	448	104	0	0	0	71	0	623
	TOTAL Sandia - Tonopah	0	1,180	273	0	0	0	188	0	1,641
	TOTAL SANDIA	901	10,265	1,818	500	2,020	938	1,845	16,677	34,964

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
PANTEX												
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	60
GB	Stockpile Management	0	0	0	0	0	0	0	0	13,400	13,400	44,370
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	214
	TOTAL Pantex	0	0	0	0	0	0	0	0	13,400	13,400	44.644
PINELLAS												
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	260
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	0
GG	Worker and Community Trans. Prog.	0	0	0	0	0	0	0	0	0	0	548
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Pinellas	0	0	0	0	0	0	0	0	0	0	808
SANDIA NATIONAL LAB - ALBUQUERQUE												
GA	Fissile Material Disposition	0	0	0	0	0	0	0	0	0	0	1,280
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	1,884
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	13,901
GD	Nuclear Safeguards & Security	0	244	0	0	0	237	481	0	0	0	6,981
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	0	0	0	0	0
	All Other B & R's	200	155	125	35	22	20	557	0	0	0	5,133
	TOTAL Sandia - Albuquerque	200	399	125	35	22	257	1,038	0	0	0	29,179
SANDIA NATIONAL LAB - CALIFORNIA												
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	295
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	2,924
	All Other B & R's	0	23	0	0	3	0	26	0	0	0	1,989
	TOTAL Sandia - California	0	23	0	0	3	0	26	0	0	0	5,208
SANDIA NATIONAL LAB - TONOPAH TEST RANGE												
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	91
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	927
	All Other B & R's	0	22	125	0	0	0	147	0	0	0	770
	TOTAL Sandia - Tonopah	0	22	125	0	0	0	147	0	0	0	1,788
	TOTAL SANDIA	200	444	250	35	25	257	1,211	0	0	0	36,175

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TRANSPORTATION SAFEGUARDS DIVISION									
GB Stockpile Management and Support	0	0	0	88,000	0	0	0	0	88,000
All Other B & R's	0	0	0	0	0	0	0	0	0
TOTAL Transportation Safeguards Div	0	0	0	88,000	0	0	0	0	88,000
WASTE ISOLATION PILOT PLANT (WIPP)									
EW-31 Waste Management - Defense	229	1,566	110	0	69	100	0	0	2,074
All Other B & R's	0	0	0	0	0	0	0	0	0
TOTAL WIPP	229	1,566	110	0	69	100	0	0	2,074
GRAND TOTAL, ALBUQUERQUE OPS. OFFICE	19,150	74,442	6,283	89,428	9,617	22,254	10,310	24,073	255,557

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
TRANSPORTATION SAFEGUARDS DIVISION												
GB	Stockpile Management and Support	0	0	1,807	0	0	0	1,807	350	0	350	90,157
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Transportation Safeguards Div	0	0	1,807	0	0	0	1,807	350	0	350	90,157
WASTE ISOLATION PILOT PLANT (WIPP)												
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	2,074
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL WIPP	0	0	0	0	0	0	0	0	0	0	2,074
GRAND TOTAL, ALBUQUERQUE OPS. OFFICE		263	550	2,057	40	25	665	3,600	350	13,400	13,750	272,907

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
ROCKY FLATS PLANT										
EW	Env Restor & Waste Mgmt-Defense	2,178	10,069	5,453	66	1,548	1,439	3,481	50	24,284
GB	Stockpile Management and Support	1,825	23,443	1,022	0	275	231	6,571	140	33,507
GH	Security Investigations	0	0	0	0	0	316	0	0	316
	All Other B & R's..	0	0	0	0	0	0	0	0	0
GRAND TOTAL, ROCKY FLATS		4,003	33,512	6,475	66	1,823	1,986	10,052	190	58,107

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ROCKY FLATS PLANT												
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	237	237	0	17,100	17,100	41,621
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	33,507
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	316
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL, ROCKY FLATS......		0	0	0	0	0	237	237	0	17,100	17,100	75,444

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	CHICAGO OPERATIONS OFFICE									
GD	Nuclear Safeguards & Security	1,550	0	0	0	0	0	0	0	1,550
GH	Security Investigations	0	0	0	0	0	0	0	0	0
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Chicago	1,550	0	0	0	0	0	0	0	1,550
	AMES LABORATORY									
EW-40	Technology Development	1	20	1	0	4	0	0	0	26
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0
KC	Basic Energy Sciences	4	103	10	0	23	0	4	0	144
	All Other B & R's	1	27	3	0	5	0	1	0	37
	TOTAL Ames	6	150	14	0	32	0	5	0	207
	ARGONNE NATIONAL LABORATORY - EAST									
AF	Nuclear Energy R&D	64	711	58	0	47	106	171	0	1,157
AT	Magnetic Fusion	3	43	3	0	3	7	10	0	69
EW	Env Restor & Waste Mgmt-Defense	22	237	19	0	16	35	57	0	386
EX	Env Res & Waste Mgmt - Nondefense	18	204	16	0	13	31	49	0	331
GD	Nuclear Safeguards & Security	0	0	0	0	0	171	0	90	261
KA	High Energy Physics	5	54	4	0	4	8	13	0	88
KB	Nuclear Physics	8	96	8	0	6	14	23	0	155
KC	Basic Energy Sciences	55	625	50	0	39	92	150	0	1,011
KP	Biological & Environ Research	8	86	8	0	5	12	20	0	139
	All Other B & R's	86	981	78	0	63	143	236	0	1,587
	Subtotal Argonne - East	269	3,037	244	0	196	619	729	90	5,184
	ARGONNE NATIONAL LABORATORY - WEST									
AF	Nuclear Energy R&D	201	4,160	529	129	259	169	876	0	6,323
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	75	75
EW	Env Restor & Waste Mgmt-Defense	4	58	12	3	7	5	21	0	110
EX	Env Res & Waste Mgmt - Nondefense	3	45	11	3	4	4	17	0	87
	All Other B & R's	35	413	92	23	44	30	152	0	789
	Subtotal Argonne - West	243	4,676	644	158	314	208	1,066	75	7,384
	TOTAL ANL EAST & WEST	512	7,713	888	158	510	827	1,795	165	12,568

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CHICAGO OPERATIONS OFFICE												
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	1,550
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	0
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Chicago	0	0	0	0	0	0	0	0	0	0	1,550
AMES LABORATORY												
EW-40	Technology Development	0	0	0	0	0	0	0	0	0	0	26
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	0
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	144
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	37
	TOTAL Ames	0	0	0	0	0	0	0	0	0	0	207
ARGONNE NATIONAL LABORATORY - EAST												
AF	Nuclear Energy R&D	0	0	0	0	0	0	0	0	0	0	1,157
AT	Magnetic Fusion	0	0	0	0	0	0	0	0	0	0	69
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	386
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	331
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	261
KA	High Energy Physics	0	0	0	0	0	0	0	0	0	0	88
KB	Nuclear Physics	0	0	0	0	0	0	0	0	0	0	155
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	1,011
KP	Biological & Environ. Research	0	0	0	0	0	0	0	0	0	0	139
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	1,587
	Subtotal Argonne - East	0	0	0	0	0	0	0	0	0	0	5,184
ARGONNE NATIONAL LABORATORY - WEST												
AF	Nuclear Energy R&D	0	0	0	0	0	0	0	0	0	0	6,323
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	75
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	110
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	87
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	789
	Subtotal Argonne - West	0	0	0	0	0	0	0	0	0	0	7,384
	TOTAL ANL EAST & WEST	0	0	0	0	0	0	0	0	0	0	12,568

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BROOKHAVEN NATIONAL LABORATORY										
EW	Env Restor & Waste Mgmt-Defense	0	66	0	0	0	0	0	0	66
EX	Env Res & Waste Mgmt - Nondefense	13	162	0	0	0	0	15	0	190
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	469	469
KA	High Energy Physics	87	659	59	0	25	0	72	0	902
KB	Nuclear Physics	20	244	11	0	0	0	22	0	297
KC	Basic Energy Sciences	120	1,847	82	0	34	12	179	0	2,274
KP	Biological & Environ Research	35	306	14	0	12	0	28	0	395
	All Other B & R's	289	1,286	199	0	121	83	183	0	2,161
	TOTAL Brookhaven National Lab	564	4,570	365	0	192	95	499	469	6,754
FERMI NATIONAL LABORATORY										
KA	High Energy Physics	133	1,958	164	0	228	0	24	0	2,507
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Fermi National Laboratory	133	1,958	164	0	228	0	24	0	2,507
NEW BRUNSWICK LABORATORY										
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	4,088	0	4,088
	TOTAL New Brunswick Laboratory	0	0	0	0	0	0	4,088	0	4,088
PRINCETON PLASMA PHYSICS LABORATORY										
AT	Magnetic Fusion	292	543	0	0	0	0	0	0	835
EX	Env Res & Waste Mgmt - Nondefense	16	27	0	0	0	0	0	0	43
	All Other B & R's	4	8	0	0	0	0	0	0	12
	TOTAL Princeton Plasma Phys Lab	312	578	0	0	0	0	0	0	890
GRAND TOTAL, CHICAGO OPS OFFICE		3,077	14,969	1,431	158	962	922	6,411	634	28,564

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BROOKHAVEN NATIONAL LABORATORY												
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	66
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	190
GD	Nuclear Safeguards & Security	0	0	0	0	0	25	25	0	0	0	494
KA	High Energy Physics	0	629	0	0	0	10	639	250	0	250	1 791
KB	Nuclear Physics	0	0	0	0	0	0	0	0	0	0	297
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	2,274
KP	Biological & Environ. Research	0	0	0	0	0	0	0	0	0	0	395
	All Other B & R's..	0	0	0	0	0	0	0	0	0	0	2,161
	TOTAL Brookhaven National Lab......	0	629	0	0	0	35	664	250	0	250	7,668
FERMI NATIONAL LABORATORY												
KA	High Energy Physics	58	104	0	0	0	0	162	200	0	200	2,869
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Fermi National Laboratory.	58	104	0	0	0	0	162	200	0	200	2,869
NEW BRUNSWICK LABORATORY												
GD	Nuclear Safeguards & Security	0	0	0	0	0	207	207	0	0	0	4,295
	TOTAL New Brunswick Laboratory.........	0	0	0	0	0	207	207	0	0	0	4,295
PRINCETON PLASMA PHYSICS LABORATORY												
AT	Magnetic Fusion	0	0	0	0	0	0	0	0	0	0	835
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	43
	All Other B & R's.................	0	0	0	0	0	0	0	0	0	0	12
	TOTAL Princeton Plasma Phys. Lab...	0	0	0	0	0	0	0	0	0	0	890
GRAND TOTAL, CHICAGO OPS. OFFICE...... ..		58	733	0	0	0	242	1,033	450	0	450	30,047

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GOLDEN FIELD OFFICE (NREL)									
EB Solar Energy	64	480	196	0	115	19	0	0	874
KC Basic Energy Sciences	1	12	6	0	2	1	0	0	22
GRAND TOTAL, GOLDEN FIELD OFFICE (NREL)	65	492	202	0	117	20	0	0	896

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GOLDEN FIELD OFFICE (NREL)											
EB Solar Energy	0	0	0	0	0	0	0	0	0	0	874
KC Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	22
GRAND TOTAL, GOLDEN FIELD OFFICE (NREL)... ..	0	0	0	0	0	0	0	0	0	0	896

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IDAHO OPERATIONS OFFICE										
EW-70	Facility Transition & Management	2,021	0	115	0	122	843	24	0	3,125
GH	Security Investigations	0	0	0	0	0	630	0	0	630
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Idaho Ops Office	2,021	0	115	0	122	1,473	24	0	3,755
LOCKHEED TECHNOLOGIES COMPANY-IDAHO										
AJ	Naval Reactors	56	2,489	144	0	60	68	34	0	2,851
EW	Env Restor & Waste Mgmt-Defense	422	6,320	1,065	0	440	507	258	0	9,012
GB	Weapons Activities (RD&T)	4	46	11	0	5	6	2	200	274
GD	Nuclear Safeguards & Security	827	0	0	0	0	0	0	0	827
GE	Materials Support	11	2,856	2,652	0	596	933	862	225	8,135
	All Other B & R's	86	1,467	213	0	89	102	52	0	2,009
	TOTAL Lockheed-Idaho	1,406	13,178	4,085	0	1,190	1,616	1,208	425	23,108
GRAND TOTAL, IDAHO OPS OFFICE		3,427	13,178	4,200	0	1,312	3,089	1,232	425	26,863

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IDAHO OPERATIONS OFFICE												
EW-70	Facility Transition & Management	0	0	0	0	0	0	0	0	0	0	3,125
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	630
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Idaho Ops Office.	0	0	0	0	0	0	0	0	0	0	3,755
LOCKHEED TECHNOLOGIES COMPANY-IDAHO												
AJ	Naval Reactors	0	0	0	0	0	0	0	0	0	0	2,851
EW	Env Restor & Waste Mgmt-Defense	0	1,011	0	0	60	0	1,071	0	8,382	8,382	18,465
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	274
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	827
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	8,135
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	2,009
	TOTAL Lockheed-Idaho.	0	1,011	0	0	60	0	1,071	0	8,382	8,382	32,561
GRAND TOTAL, IDAHO OPS OFFICE		0	1,011	0	0	60	0	1,071	0	8,382	8,382	36,316

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	NEVADA OPERATIONS OFFICE									
GB	Weapons Activities (RD&T)	3,862	0	0	0	0	0	0	0	3,862
GH	Security Investigations	0	0	0	0	0	700	0	0	700
NT	Intelligence	0	0	1,400	0	0	0	0	0	1,400
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Nevada	3,862	0	1,400	0	0	700	0	0	5,962
	BECHTEL NEVADA									
DB	Waste Management Systems	354	1,459	0	0	92	163	0	0	2,068
EW	Waste Management - Defense	111	386	40	0	62	67	0	0	666
GB	Weapons Activities (RD&T)	3,603	12,531	4,732	210	1,124	1 454	0	220	23,874
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	300	300
GJ	Arms Control & Nonproliferation	0	0	1	0	1	0	0	0	2
NT	Intelligence	12	0	26	0	21	9	0	0	68
	All Other B & R's	81	(26)	169	0	187	132	0	0	543
	TOTAL Bechtel Nevada	4,161	14,350	4,968	210	1,487	1,825	0	520	27,521
	GRAND TOTAL, NEVADA	8,023	14,350	6,368	210	1,487	2,525	0	520	33,483

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NEVADA OPERATIONS OFFICE												
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	3,862
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	700
NT	Intelligence	0	0	0	0	0	0	0	0	0	0	1,400
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Nevada	0	0	0	0	0	0	0	0	0	0	5,962
BECHTEL NEVADA												
DB	Waste Management Systems	0	0	0	0	0	0	0	0	0	0	2,068
EW	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	666
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	23,874
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	300
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	0	0	0	0	2
NT	Intelligence	0	0	0	0	0	0	0	0	0	0	68
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	543
	TOTAL Bechtel Nevada	0	0	0	0	0	0	0	0	0	0	27,521
GRAND TOTAL, NEVADA		0	0	0	0	0	0	0	0	0	0	33,483

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
OAKLAND OPERATIONS OFFICE										
GB	Weapons Activities (RD&T)	930	0	42	0	546	1,411	26	0	2,955
GH	Security Investigations	0	0	0	0	0	1,502	0	0	1,502
WM-60	General Admin Contractual Serv	0	0	300	0	0	0	0	0	300
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Oakland Ops Office	930	0	342	0	546	2,913	26	0	4,757
LAWRENCE BERKELEY NATL LAB (LBNL)										
EC	Buildings Sector - EERE	3	73	6	0	0	0	0	0	82
EX	Env Res & Waste Mgmt - Nondefense	5	122	10	0	0	0	0	0	137
KA	High Energy Physics	5	133	11	0	0	0	0	0	149
KB	Nuclear Physics	3	65	5	0	0	0	0	0	73
KC	Basic Energy Sciences	13	317	25	0	0	0	0	0	355
KP	Biological & Environmental Res	5	119	10	0	0	0	0	0	134
	All Other B & R's	5	145	12	0	0	0	0	0	162
	TOTAL Lawrence Berkeley Lab	39	974	79	0	0	0	0	0	1,092
LAWRENCE LIVERMORE NATL LAB (LLNL)										
AT	Magnetic Fusion	83	352	201	0	92	87	61	0	876
DB	Waste Management System	63	264	150	0	69	65	46	0	657
EW	Env Restor & Waste Mgmt-Defense	206	864	494	0	227	214	150	0	2,155
GA	Fissile Material Disposition	0	0	0	0	0	0	0	210	210
GB	Weapons Activities (RD&T)	1,439	6,004	3,433	0	1,569	1,485	3,620	0	17,550
GC	Nonproliferation & Verification R&D	154	639	365	0	167	158	111	0	1,594
GD	Nuclear Safeguards & Security	168	0	0	0	0	0	0	2,810	2,978
GH	Security Investigations	0	0	0	0	0	2,200	0	0	2,200
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	2,600	0	2,600
KC	Basic Energy Sciences	92	382	219	0	100	94	66	0	953
KP	Biological & Environmental Res	76	313	179	0	82	78	54	0	782
	All Other B & R's	451	1,891	1,081	0	494	468	329	0	4,714
	TOTAL Lawrence Livermore Lab	2,732	10,709	6,122	0	2,800	4,849	7,037	3,020	37,269
STANFORD LINEAR ACCELERATOR										
EX	Env Res & Waste Mgmt - Nondefense	0	32	0	0	0	0	0	0	32
KA	High Energy Physics	0	687	0	0	0	0	0	0	687
KC	Basic Energy Sciences	0	127	0	0	0	0	0	0	127
	All Other B & R's	0	22	0	0	0	0	0	0	22
	TOTAL Stanford Linear Accelerator	0	868	0	0	0	0	0	0	868
GRAND TOTAL, OAKLAND OPERATIONS OFFICE		3,701	12,551	6,543	0	3,346	7,762	7,063	3,020	43,986

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	OAKLAND OPERATIONS OFFICE											
GB	Weapons Activities (RD&T)	0	0	0	27	106	0	133	0	0	0	3,088
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	1,502
WM-60	General Admin. Contractual Serv.	0	0	0	0	0	0	0	0	0	0	300
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Oakland Ops. Office......	0	0	0	27	106	0	133	0	0	0	4,890
	LAWRENCE BERKELEY NATL LAB (LBNL)											
EC	Buildings Sector - EERE	0	0	0	0	0	0	0	76	0	76	158
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	125	0	125	262
KA	High Energy Physics	0	0	0	0	0	0	0	137	0	137	286
KB	Nuclear Physics	0	0	0	0	0	0	0	66	0	66	139
KC	Basic Energy Sciences	0	0	0	0	0	0	0	325	0	325	680
KP	Biological & Environmental Res.	0	0	0	0	0	0	0	122	0	122	256
	All Other B & R's	0	0	0	0	0	0	0	149	0	149	311
	TOTAL Lawrence Berkeley Lab... .	0	0	0	0	0	0	0	1,000	0	1,000	2,092
	LAWRENCE LIVERMORE NATL LAB (LLNL)											
AT	Magnetic Fusion	0	11	0	0	0	0	11	0	0	0	887
DB	Waste Management System	0	8	0	0	0	0	8	0	0	0	665
EW	Env Restor & Waste Mgmt-Defense	1	26	0	0	0	0	27	0	0	0	2,182
GA	Fissile Material Disposition	0	0	0	0	0	0	0	0	0	0	210
GB	Weapons Activities (RD&T)	5	183	0	0	0	0	188	0	0	0	17,738
GC	Nonproliferation & Verification R&D	1	19	0	0	0	0	20	0	0	0	1,614
GD	Nuclear Safeguards & Security	90	0	0	0	0	0	90	0	0	0	3,068
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	2,200
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	0	0	0	0	2,600
KC	Basic Energy Sciences	0	12	0	0	0	0	12	0	0	0	965
KP	Biological & Environmental Res.	0	10	0	0	0	0	10	0	0	0	792
	All Other B & R's................	2	58	0	0	0	0	60	0	0	0	4,774
	TOTAL Lawrence Livermore Lab..... ...	99	327	0	0	0	0	426	0	0	0	37,695
	STANFORD LINEAR ACCELERATOR											
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	32
KA	High Energy Physics	0	0	0	0	0	0	0	0	0	0	687
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	127
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	22
	TOTAL Stanford Linear Accelerator..	0	0	0	0	0	0	0	0	0	0	868
	GRAND TOTAL, OAKLAND OPERATIONS OFFICE..... ..	99	327	0	27	106	0	559	1,000	0	1,000	45,545

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OAK RIDGE OPERATIONS OFFICE										
AF 99	Oak Ridge Landlord (NE)	0	1,240	45	0	718	0	0	0	2,003
GB	Stockpile Management	2,824	537	0	0	339	756	0	0	4,456
GH	Security Investigations	0	0	0	0	0	0	0	0	0
WA	General Admin - Program Direction	0	0	0	0	0	282	0	0	282
	All Other B & R's	0	0	0	0	0	141	0	0	141
	TOTAL Oak Ridge Ops Office	2,824	1,777	45	0	1,057	1,179	0	0	6,882
CONTINUOUS ELECTRON BEAM ACCELER FACIL										
KB	Nuclear Physics	0	415	0	0	50	0	0	0	465
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Continuous Electron Facil	0	415	0	0	50	0	0	0	465
K-25 SITE										
EW-20	Environmental Restoration - Defense	291	4,303	286	54	738	507	407	0	6,586
EW-31	Waste Management - Defense	93	576	55	14	245	145	52	0	1,180
	All Other B & R's	49	314	30	14	135	80	28	0	650
	TOTAL K-25 Site	433	5,193	371	82	1,118	732	487	0	8,416
CENTRAL										
GD	Nuclear Safeguards and Security	213	0	0	0	0	0	0	500	713
	All Other B&R's	0	0	0	0	0	0	0	0	0
	TOTAL Central	213	0	0	0	0	0	0	500	713
OR INSTIT FOR SCIENCE & EDUCATION (ORISE)										
GD	Nuclear Safeguards & Security	0	0	0	0	0	563	0	0	563
GH	Security Investigations	0	0	0	0	0	385	0	0	385
KG	Multi-Prgm Enrgy Lab - Fac Sup	0	0	0	0	0	0	0	0	0
	All Other B & R's	0	123	0	0	0	29	0	0	152
	TOTAL ORISE	0	123	0	0	0	977	0	0	1,100

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OAK RIDGE OPERATIONS OFFICE												
AF 99	Oak Ridge Landlord (NE)	0	45	0	0	0	0	45	0	0	0	2,048
GB	Stockpile Management	0	0	0	0	100	0	100	0	0	0	4,556
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	0
WA	General Admin - Program Direction	0	0	0	0	0	0	0	0	0	0	282
	All Other B & R's......	0	0	0	0	0	0	0	0	0	0	141
	TOTAL Oak Ridge Ops. Office...	0	45	0	0	100	0	145	0	0	0	7,027
CONTINUOUS ELECTRON BEAM ACCELER FACIL.												
KB	Nuclear Physics	0	0	0	50	0	0	50	0	0	0	515
	All Other B & R's....	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Continuous Electron Facil..	0	0	0	50	0	0	50	0	0	0	515
K-25 SITE												
EW-20	Environmental Restoration - Defense	0	0	0	0	0	0	0	0	0	0	6,586
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	1,180
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	650
	TOTAL K-25 Site......	0	0	0	0	0	0	0	0	0	0	8,416
CENTRAL												
GD	Nuclear Safeguards and Security	93	0	0	0	0	0	93	0	0	0	806
	All Other B&R's....................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Central	93	0	0	0	0	0	93	0	0	0	806
OR INSTIT FOR SCIENCE & EDUCATION (ORISE)												
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	563
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	385
KG	Multi-Prgm Enrgy Lab - Fac Sup	0	0	0	0	0	0	0	150	0	150	150
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	152
	TOTAL ORISE...	0	0	0	0	0	0	0	150	0	150	1,250

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OAK RIDGE NATIONAL LABORATORY (ORNL)										
AF	Nuclear Energy Research & Develop	25	126	19	0	23	41	10	0	244
AK	Electric Energy Systems	25	126	19	0	23	41	10	0	244
AT	Magnetic Fusion	43	221	33	1	38	71	17	0	424
EE	Transportation Sector	43	221	33	1	38	71	17	0	424
EW-20	Environmental Restoration - Defense	53	267	39	1	46	86	20	0	512
EW-31	Waste Management - Defense	68	351	53	1	62	114	27	0	676
EW-40	Technology Development	44	233	33	1	40	72	18	0	441
EX-20	Environmental Restoration - Nondef	44	233	33	1	40	72	18	0	441
EX-31	Waste Management - Nondefense	25	126	19	0	23	41	10	0	244
KC	Basic Energy Sciences	126	614	92	2	110	200	48	0	1,192
KE	Advanced Neutron Source	25	126	19	0	23	41	10	0	244
KP	Biological & Environ Research	43	221	33	1	38	71	17	0	424
	All Other B & R's	228	1,036	161	4	191	344	85	0	2,049
	TOTAL Oak Ridge National Lab	792	3,901	586	13	695	1,265	307	0	7,559
PADUCAH GASEOUS DIFFUSION PLANT										
CD	Uranium Programs	102	304	145	0	318	319	0	0	1,188
EU-20	Uranium Enrichment Decont & Decom	263	710	338	0	338	338	0	0	1,987
	TOTAL Paducah Gaseous Diff Plant	365	1,014	483	0	656	657	0	0	3,175
PORTSMOUTH GASEOUS DIFFUSION PLANT										
CD	Uranium Programs	0	0	0	0	0	0	0	0	0
EU-20	Uranium Enrichment Decont & Decom	244	2,776	289	0	161	236	194	0	3,900
	All Other B&R's	0	148	0	0	0	0	0	0	148
	TOTAL Portsmouth Gas Diff Plant	244	2,924	289	0	161	236	194	0	4,048
Y-12 PLANT										
EW-20	Environmental Restoration - Defense	62	174	70	1	80	95	67	0	549
EW-31	Waste Management - Defense	60	172	68	1	75	89	62	0	527
GB	Stockpile Management and Support	625	18,194	4,945	101	2,794	961	6,560	0	34,180
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	2,330	2,330
GE	Materials Support	13	379	103	2	61	18	136	0	712
	All Other B & R's	57	160	62	2	71	83	59	0	494
	TOTAL Y-12 Plant	817	19,079	5,248	107	3,081	1,246	6,884	2,330	38,792
GRAND TOTAL, OAK RIDGE OPS OFFICE		5,688	34,426	7,022	202	6,818	6,292	7,872	2,830	71,150

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OAK RIDGE NATIONAL LABORATORY (ORNL)												
AF	Nuclear Energy Research & Develop	0	0	0	0	0	0	0	0	0	0	244
AK	Electric Energy Systems	0	0	0	0	0	0	0	0	0	0	244
AT	Magnetic Fusion	0	0	0	0	0	0	0	0	0	0	424
EE	Transportation Sector	0	0	0	0	0	0	0	0	0	0	424
EW-20	Environmental Restoration - Defense	0	0	0	0	0	0	0	0	0	0	512
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	676
EW-40	Technology Development	0	0	0	0	0	0	0	0	0	0	441
EX-20	Environmental Restoration - Nondef	0	0	0	0	0	0	0	0	0	0	441
EX-31	Waste Management - Nondefense	0	0	0	0	0	0	0	0	0	0	244
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	1,192
KE	Advanced Neutron Source	0	0	0	0	0	0	0	0	0	0	244
KP	Biological & Environ Research	0	0	0	0	0	0	0	0	0	0	424
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	2,049
	TOTAL Oak Ridge National Lab....	0	0	0	0	0	0	0	0	0	0	7,559
PADUCAH GASEOUS DIFFUSION PLANT												
CD	Uranium Programs	0	0	0	0	0	0	0	0	0	0	1,188
EU-20	Uranium Enrichment Decont & Decom	0	0	0	0	0	0	0	0	0	0	1,987
	TOTAL Paducah Gaseous Diff Plant	0	0	0	0	0	0	0	0	0	0	3,175
PORTSMOUTH GASEOUS DIFFUSION PLANT												
CD	Uranium Programs	0	0	0	0	0	0	0	0	0	0	0
EU-20	Uranium Enrichment Decont & Decom	0	0	0	0	0	0	0	0	0	0	3,900
	All Other B&R's	0	0	0	0	0	0	0	0	0	0	148
	TOTAL Portsmouth Gas Diff Plant	0	0	0	0	0	0	0	0	0	0	4,048
Y-12 PLANT												
EW-20	Environmental Restoration - Defense	0	0	0	0	0	0	0	0	0	0	549
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	527
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	34,180
GD	Nuclear Safeguards & Security	40	0	0	0	0	0	40	0	0	0	2,370
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	712
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	494
	TOTAL Y-12 Plant	40	0	0	0	0	0	40	0	0	0	38,832
GRAND TOTAL, OAK RIDGE OPS OFFICE		133	45	0	50	100	0	328	150	0	150	71,628

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	OHIO FIELD OFFICE									
	FERMC (Fernald Env Rest Manag Corp)									
EW	Env Restor & Waste Mgmt-Defense	0	1,710	0	0	0	0	618	0	2,328
GE	Materials Support	0	0	0	0	0	0	230	0	230
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL FERMC	0	1,710	0	0	0	0	848	0	2,558
	MOUND LABORATORY (DAYTON)									
EW	Env Restor & Waste Mgmt-Defense	371	2,123	901	0	414	231	561	424	5,025
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	810	810
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Mound	371	2,123	901	0	414	231	561	1,234	5,835
	WEST VALLEY									
EX-33	West Valley Demonstration Project	301	955	32	0	0	0	0	0	1,288
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL West Valley	301	955	32	0	0	0	0	0	1,288
	GRAND TOTAL, OHIO FIELD OFFICE	672	4,788	933	0	414	231	1,409	1,234	9,681

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	OHIO FIELD OFFICE											
	FERMC (Fernald Env Rest. Manag Corp)											
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	2,328
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	230
	All Other B & R's....	0	0	0	0	0	0	0	0	0	0	0
	TOTAL FERMC...........	0	0	0	0	0	0	0	0	0	0	2,558
	MOUND LABORATORY (DAYTON)											
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	5,025
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	0
GD	Nuclear Safeguards & Security	68	0	0	0	0	0	68	0	0	0	878
	All Other B & R's...	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Mound	68	0	0	0	0	0	68	0	0	0	5,903
	WEST VALLEY											
EX-33	West Valley Demonstration Project	0	0	0	0	0	0	0	0	0	0	1,288
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL West Valley	0	0	0	0	0	0	0	0	0	0	1,288
	GRAND TOTAL, OHIO FIELD OFFICE	68	0	0	0	0	0	68	0	0	0	9,749

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OFFICE OF SCIENTIFIC & TECHNICAL INFO.										
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0
LA	Technical Infor Mgmt Program	25	44	67	0	248	8	0	0	392
	All Other B & R's	0	0	1	0	0	0	0	0	1
GRAND TOTAL, OFF. SCE & TECH. INFO		25	44	68	0	248	8	0	0	393

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OFFICE OF SCIENTIFIC & TECHNICAL INFO											
GD Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	0
LA Technical Infor Mgmt Program	0	0	0	0	0	0	0	0	0	0	392
All Other B & R's	0	0	0	0	0	0	0	0	0	0	1
GRAND TOTAL, OFF SCE & TECH. INFO	0	0	0	0	0	0	0	0	0	0	393

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
RICHLAND OPERATIONS OFFICE										
AF	Nuclear Energy R&D	37	148	17	0	20	50	8	0	280
EC	Buildings Sector	17	11	18	0	10	8	9	0	73
ED	Industrial Sector	11	8	12	0	6	5	6	0	48
EE	Transportation Sector	10	7	11	0	6	5	5	0	44
EW-20	Environmental Restoration	22	15	23	0	12	11	11	0	94
EW-31	Waste Management - Defense	1,245	8,985	2,023	0	495	410	990	0	14,148
EW-40	Technology Development	118	469	56	0	59	159	26	0	887
EW-50	Transportation Management	25	102	12	0	12	34	5	0	190
EW-70	Facility Transition & Management, Defense	3,998	46	1,011	0	2,495	0	1,557	0	9,107
EX-31	Waste Management - Nondefense	22	15	23	0	13	11	11	0	95
EX-70	Facility Transition & Management, Nondef	108	1,315	716	0	0	0	121	0	2,260
GC	Nonproliferation & Verification R&D	32	22	33	0	19	16	16	0	138
GD	Nuclear Safeguards & Security	870	0	0	0	1,152	0	0	0	2,022
GE	Materials Support	137	7,726	1,338	78	0	0	488	0	9,767
GH	Security Investigations	0	0	0	0	0	880	0	0	880
HA	Environment, Safety & Health	0	0	0	0	0	0	0	0	0
KC	Basic Energy Sciences	26	17	26	0	14	12	13	0	108
KP	Biological & Environ Research	77	51	78	0	43	36	38	0	323
KU	ER Lab Technology Transfer	26	17	26	0	14	12	13	0	108
	All Other B & R's	95	241	68	0	50	91	32	0	577
	TOTAL Richland Operations Office	6,876	19,195	5,491	78	4,420	1,740	3,349	0	41,149

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RICHLAND OPERATIONS OFFICE												
AF	Nuclear Energy R&D	0	0	0	0	0	0	0	0	0	0	280
EC	Buildings Sector	0	0	0	0	0	0	0	0	0	0	73
ED	Industrial Sector	0	0	0	0	0	0	0	0	0	0	48
EE	Transportation Sector	0	0	0	0	0	0	0	0	0	0	44
EW-20	Environmental Restoration	0	0	0	0	0	0	0	0	0	0	94
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	14,148
EW-40	Technology Development	0	0	0	0	0	0	0	0	0	0	887
EW-50	Transportation Management	0	0	0	0	0	0	0	0	0	0	190
EW-70	Facility Transition & Management, Defense	0	0	0	0	0	0	0	0	0	0	9,107
EX-31	Waste Management - Nondefense	0	0	0	0	0	0	0	0	0	0	95
EX-70	Facility Transition & Management, Nondef	0	0	0	0	0	0	0	0	0	0	2,260
GC	Nonproliferation & Verification R&D	0	0	0	0	0	0	0	0	0	0	138
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	2,022
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	9,767
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	880
HA	Environment, Safety & Health	0	0	0	0	0	0	0	0	0	0	0
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	108
KP	Biological & Environ Research	0	0	0	0	0	0	0	0	0	0	323
KU	ER Lab Technology Transfer	0	0	0	0	0	0	0	0	0	0	108
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	577
	TOTAL Richland Operations Office	0	0	0	0	0	0	0	0	0	0	41,149

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
SAVANNAH RIVER OPERATIONS OFFICE										
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0
EW-70	Landlord	6,890	0	0	0	0	61	1,600	0	8,551
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0
GE	Materials Support	0	0	0	0	0	0	0	0	0
GH	Security Investigations	0	0	0	0	0	2,507	0	0	2,507
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Savannah River	6,890	0	0	0	0	2,568	1,600	0	11,058
WACKENHUT SERVICES INC										
EW-31	Waste Management - Defense	377	922	122	0	13	16	0	0	1,450
EW-70	Landlord	15,955	38,918	5,134	0	565	663	0	0	61,235
GB	Stockpile Management and Support	939	2,287	302	0	33	39	0	0	3,600
GE	Materials Support	0	0	0	0	0	0	0	0	0
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Wackenhut Services Inc.	17,271	42,127	5,558	0	611	718	0	0	66,285
WESTINGHOUSE SAVANNAH RIVER										
EW-31	Waste Management - Defense	497	292	3,526	73	657	839	765	126	6,775
EW-70	Landlord	692	406	4,906	102	912	1,166	1,065	174	9,423
GB	Stockpile Management and Support	105	62	741	15	139	176	161	26	1,425
GE	Materials Support	0	0	0	0	0	0	0	0	0
	All Other B & R's	37	22	257	5	48	61	55	9	494
	TOTAL Westinghouse Savannah Rv	1,331	782	9,430	195	1,756	2,242	2,046	335	18,117
GRAND TOTAL, SAVANNAH RIVER		25,492	42,909	14,988	195	2,367	5,528	3,646	335	95,460

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SAVANNAH RIVER OPERATIONS OFFICE												
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	0
EW-70	Landlord	0	0	0	0	0	0	0	0	0	0	8,551
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	0
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	0
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	2,507
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Savannah River	0	0	0	0	0	0	0	0	0	0	11,058
WACKENHUT SERVICES INC												
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	1,450
EW-70	Landlord	0	0	0	0	0	0	0	0	0	0	61,235
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	3,600
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	0
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Wackenhut Services Inc	0	0	0	0	0	0	0	0	0	0	66,285
WESTINGHOUSE SAVANNAH RIVER												
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	6,775
EW-70	Landlord	0	1,700	0	0	0	0	1,700	0	0	0	11,123
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	1,425
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	0
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	494
	TOTAL Westinghouse Savannah Rv	0	1,700	0	0	0	0	1,700	0	0	0	19,817
GRAND TOTAL, SAVANNAH RIVER		0	1,700	0	0	0	0	1,700	0	0	0	97,160

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WESTERN AREA POWER ADMIN (WAPA)										
CF	Power Marketing	184	85	451	0	37	40	0	0	797
GRAND TOTAL, WAPA		184	85	451	0	37	40	0	0	797
BARTLESVILLE PROJECT OFFICE										
AN	Energy Tech Ctr Prog. Dir.	183	0	74	0	25	8	0	0	290
	All Other B & R's	0	0	0	0	0	0	0	0	0
GRAND TOTAL, BARTLESVILLE		183	0	74	0	25	8	0	0	290
MORGANTOWN ENERGY TECH CENTER (METC)										
AN	Energy Tech Ctr Prog Dir	18	538	0	0	60	0	0	0	616
	All Other B & R's	0	0	0	0	0	0	0	0	0
GRAND TOTAL, METC		18	538	0	0	60	0	0	0	616
PITTSBURGH ENERGY TECHN CENTER (PETC)										
AN	Energy Tech Ctr Prog. Dir	30	620	55	0	10	10	0	0	725
	All Other B & R's	0	0	0	0	0	0	0	0	0
GRAND TOTAL, PETC		30	620	55	0	10	10	0	0	725
NAVAL PETROLEUM AND OIL SHALE RESERVES										
CB	Naval Petroleum & Oil Shale Res	0	1,171	9	0	0	0	0	0	1,180
	All Other B & R's	0	0	0	0	0	0	0	0	0
GRAND TOTAL, NAVAL PETRO & O S RES.		0	1,171	9	0	0	0	0	0	1,180
STRATEGIC PETROLEUM RESERVES (SPRO)										
SA	Strategic Petroleum Reserve	1,425	13,222	0	0	0	126	0	0	14,773
GRAND TOTAL, SPRO		1,425	13,222	0	0	0	126	0	0	14,773

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WESTERN AREA POWER ADMIN. (WAPA)												
CF	Power Marketing	0	0	0	0	0	0	0	0	0	0	797
GRAND TOTAL, WAPA		0	0	0	0	0	0	0	0	0	0	797
BARTLESVILLE PROJECT OFFICE												
AN	Energy Tech Ctr Prog. Dir.	0	0	0	0	0	0	0	0	0	0	290
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL, BARTLESVILLE		0	0	0	0	0	0	0	0	0	0	290
MORGANTOWN ENERGY TECH CENTER (METC)												
AN	Energy Tech Ctr Prog. Dir.	0	0	0	0	0	0	0	200	0	200	816
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL, METC		0	0	0	0	0	0	0	200	0	200	816
PITTSBURGH ENERGY TECHN CENTER (PETC)												
AN	Energy Tech Ctr Prog Dir.	0	0	0	0	0	0	0	150	0	150	875
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL, PETC		0	0	0	0	0	0	0	150	0	150	875
NAVAL PETROLEUM AND OIL SHALE RESERVES												
CB	Naval Petroleum & Oil Shale Res	0	0	0	0	0	0	0	0	0	0	1,180
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL, NAVAL PETRO. & O S RES		0	0	0	0	0	0	0	0	0	0	1,180
STRATEGIC PETROLEUM RESERVES (SPRO)												
SA	Strategic Petroleum Reserve	0	0	0	0	0	0	0	0	0	0	14,773
GRAND TOTAL, SPRO		0	0	0	0	0	0	0	0	0	0	14,773

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
PITTSBURGH NAVAL REACTORS (PNR)										
AJ	Naval Reactors	261	6,243	134	7	518	54	914	891	9,022
GH	Security Investigations	0	0	0	0	0	0	0	0	0
GRAND TOTAL, PNR		261	6,243	134	7	518	54	914	891	9,022
SCHENECTADY NAVAL REACTORS (SNR)										
AJ	Naval Reactors	638	5,034	2,866	377	666	404	632	0	10,617
GH	Security Investigations	0	0	0	0	0	712	0	0	712
GRAND TOTAL, SNR		638	5,034	2,866	377	666	1,116	632	0	11,329
HEADQUARTERS										
AD	Fossil Energy Program Direction	110	0	0	0	0	0	0	0	110
GB0506	Emergency Management Division(ND)	20	0	75	0	75	0	0	0	170
GD	Nuclear Safeguards & Security	22,458	8,629	750	0	10,320	0	0	0	42,157
GH	Security Investigations	0	0	0	0	0	3,191	0	0	3,191
HS	Security Evaluations	12,000	0	0	0	0	0	0	0	12,000
NB	Emergency Preparedness	0	0	0	0	0	0	0	0	0
NS	Nuclear Safety Oversight	23	0	5	0	12	0	15	0	55
NT	Intelligence	115	0	29	0	288	201	0	0	633
WA-50	General Admin Program Direction	0	0	0	0	0	0	0	0	0
WM-10	General Admin Contractual Serv	19	0	0	0	0	0	0	0	19
	All Other B & R's (GJ)	73	0	0	0	183	39	0	0	295
GRAND TOTAL, HEADQUARTERS		34,818	8,629	859	0	10,878	3,431	15	0	58,630
GRAND TOTAL, DEPARTMENT OF ENERGY		117,756	300,398	64,452	90,721	45,125	57,142	52,905	34,152	762,651

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PITTSBURGH NAVAL REACTORS (PNR)											
AJ Naval Reactors	0	284	0	0	0	84	368	0	0	0	9,390
GH Security Investigations	0	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL, PNR	0	284	0	0	0	84	368	0	0	0	9,390
SCHENECTADY NAVAL REACTORS (SNR)											
AJ Naval Reactors	0	132	0	0	0	0	132	0	0	0	10,749
GH Security Investigations	0	0	0	0	0	0	0	0	0	0	712
GRAND TOTAL, SNR	0	132	0	0	0	0	132	0	0	0	11,461
HEADQUARTERS											
AD Fossil Energy Program Direction	0	0	0	0	0	0	0	0	0	0	110
GB0506 Emergency Management Division(ND)	0	0	0	0	0	0	0	0	0	0	170
GD Nuclear Safeguards & Security	880	500	0	140	0	0	1,520	0	0	0	43,677
GH Security Investigations	0	0	0	0	0	0	0	0	0	0	3,191
HS Security Evaluations	0	0	0	0	0	0	0	0	0	0	12,000
NB Emergency Preparedness	0	0	0	0	0	0	0	0	0	0	0
NS Nuclear Safety Oversight	0	0	0	0	0	0	0	0	0	0	55
NT Intelligence	0	0	0	0	0	0	0	0	0	0	633
WA-50 General Admin Program Direction	0	0	0	0	0	0	0	0	0	0	0
WM-10 General Admin Contractual Serv	0	0	0	0	0	0	0	0	0	0	19
All Other B & R's (GJ)	0	0	0	0	0	0	0	0	0	0	295
GRAND TOTAL, HEADQUARTERS	880	500	0	140	0	0	1,520	0	0	0	60,150
GRAND TOTAL, DEPARTMENT OF ENERGY	1,501	5,282	2,057	257	291	1,228	10,616	2,300	38,882	41,182	814,449

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
-->	ALBUQUERQUE OPERATIONS OFFICE									
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0
GB	Stockpile Management and Support	0	0	0	0	712	0	0	0	712
GB	Program Direction	4,653	489	92	0	427	3,599	0	0	9,260
GH	Security Investigations	0	0	0	0	0	6,597	0	0	6,597
	All Other B & R's................	0	0	0	0	0	0	0	0	0
	TOTAL Albuquerque..............................	4,653	489	92	0	1,139	10,196	0	0	16,569
-->	ALLIED (KANSAS CITY)									
EW	Env Restor & Waste Mgmt-Defense	2	57	3	0	9	3	0	0	74
GB	Stockpile Management and Support	25	5,265	262	0	1,003	252	0	0	6,807
	All Other B & R's................	0	0	0	0	0	0	0	0	0
	TOTAL Allied.........	27	5,322	265	0	1,012	255	0	0	6,881
-->	CENTRAL TRAINING ACADEMY									
GD	Nuclear Safeguards & Security	9,137	0	0	0	0	0	0	0	9,137
	TOTAL Central Training Academy.....	9,137	0	0	0	0	0	0	0	9,137
-->	GRAND JUNCTION PROJECT OFFICE									
EW	Env Restor & Waste Mgmt-Defense	50	155	3	0	74	20	4	0	306
EX	Env Res & Waste Mgmt - Nondefense	104	328	8	0	159	43	6	0	648
	All Other B & R's................	0	0	0	0	0	0	0	0	0
	TOTAL Grand Junction Proj. Office .	154	483	11	0	233	63	10	0	954

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-->	ALBUQUERQUE OPERATIONS OFFICE											
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	0
GB	Stockpile Management and Support	0	6	0	5	30	0	41	0	0	0	753
GB	Program Direction	0	0	0	0	0	0	0	0	0	0	9,260
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	6,597
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Albuquerque................................	0	6	0	5	30	0	41	0	0	0	16,610
-->	ALLIED (KANSAS CITY)											
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	74
GB	Stockpile Management and Support	0	148	0	0	0	0	148	0	0	0	6,955
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Allied.................. ...	0	148	0	0	0	0	148	0	0	0	7,029
-->	CENTRAL TRAINING ACADEMY											
GD	Nuclear Safeguards & Security	63	0	0	0	0	0	63	0	0	0	9,200
	TOTAL Central Training Academy....	63	0	0	0	0	0	63	0	0	0	9,200
-->	GRAND JUNCTION PROJECT OFFICE											
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	306
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	648
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Grand Junction Proj. Office....	0	0	0	0	0	0	0	0	0	0	954

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
--> LOS ALAMOS NATIONAL LABORATORY										
AT	Magnetic Fusion	27	149	13	6	23	20	39	0	277
EW	Env Restor & Waste Mgmt-Defense	1,168	6,467	575	282	1,016	775	1,675	0	11,938
GA	Fissile Material Disposition	0	0	0	0	0	0	0	925	025
GB	Weapons Activities (RD&T)	1,542	13,033	759	345	1,341	1,020	2,210	0	20,250
GB	Stockpile Management and Support	447	7,593	220	100	389	300	641	0	9,690
GC	Nonproliferation & Verif. R&D	297	1,646	147	67	259	195	426	0	3,037
GD	Nuclear Safeguards and Security	0	0	0	0	0	0	0	6,523	6,523
GE	Materials Support	38	301	19	8	33	25	54	0	478
GJ	Arms Control & Nonproliferation	86	479	42	19	76	55	124	0	881
KB	Nuclear Physics	206	1,138	100	46	178	135	700	0	2,503
KC	Basic Energy Sciences	108	599	53	23	95	70	155	0	1,103
KP	Biological & Environ. Research	119	659	58	26	103	80	170	0	1,215
	All Other B & R's	0	792	0	0	0	0	0	0	792
	TOTAL Los Alamos	4,038	32,856	1,966	902	3,513	2,675	6,194	7,448	59,612
--> PANTEX										
EW	Env Restor & Waste Mgmt-Defense	0	85	0	0	0	0	0	0	85
GB	Stockpile Management and Support	0	17,290	1,840	0	1,397	6,759	1,614	0	28,900
	All Other B & R's	0	221	0	0	0	0	0	0	221
	TOTAL Pantex	0	17,596	1,840	0	1,397	6,759	1,614	0	29,206
--> PINELLAS										
EW	Env Restor & Waste Mgmt-Defense	15	312	18	0	27	22	2	0	396
GB	Stockpile Management and Support	75	1,639	91	0	138	115	12	0	2,070
GG	Worker and Community Trans. Prog.	30	651	37	0	55	48	5	0	826
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Pinellas	120	2,602	146	0	220	185	19	0	3,292

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans- portation	Total Infor- mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC- TION	TOT. SAFEGUARDS & SECURITY
-->	LOS ALAMOS NATIONAL LABORATORY											
AT	Magnetic Fusion	0	0	0	0	0	0	0	0	0	0	277
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	11,938
GA	Fissile Material Disposition	0	0	0	0	0	0	0	0	0	0	925
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	20,250
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	9,690
GC	Nonproliferation & Verif R&D	0	0	0	0	0	0	0	0	0	0	3,037
GD	Nuclear Safeguards and Security	0	0	0	0	0	608	608	0	0	0	7,131
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	478
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	0	0	0	0	881
KB	Nuclear Physics	0	0	0	0	0	0	0	0	0	0	2,503
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	1,103
KP	Biological & Environ. Research	0	0	0	0	0	0	0	0	0	0	1,215
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	792
	TOTAL Los Alamos..	0	0	0	0	0	608	608	0	0	0	60,220
-->	PANTEX											
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	85
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	15,000	15,000	43,900
	All Other B & R's............... .	0	0	0	0	0	0	0	0	0	0	221
	TOTAL Pantex.............	0	0	0	0	0	0	0	0	15,000	15,000	44,206
-->	PINELLAS											
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	396
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	2,070
GG	Worker and Community Trans. Prog.	0	0	0	0	0	0	0	0	0	0	826
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Pinellas.	0	0	0	0	0	0	0	0	0	0	3,292

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
-->	SANDIA NATIONAL LAB - ALBUQUERQUE									
GA	Fissile Material Disposition	0	0	0	0	0	0	0	750	750
GB	Stockpile Management and Support	35	302	37	23	85	31	68	1,075	1,656
GB	Weapons Activities (RD&T)	396	3,391	418	239	970	336	767	8,959	15,476
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	8,025	8,025
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	0	0	0
	All Other B & R's................	267	2,282	281	161	651	225	515	194	4,576
	TOTAL Sandia - Albuquerque......................	698	5,975	736	423	1,706	592	1,350	19,003	30,483
-->	SANDIA NATIONAL LAB - CALIFORNIA									
GB	Stockpile Management and Support	10	156	40	4	15	18	15	5	263
GB	Weapons Activities (RD&T)	112	1,732	453	43	170	194	168	52	2,924
	All Other B & R's................	75	1,164	304	29	114	129	113	35	1,963
	TOTAL Sandia - California.....................	197	3,052	797	76	299	341	296	92	5,150
-->	SANDIA NATIONAL LAB - TONOPAH TEST RANGE									
GB	Stockpile Management and Support	0	74	16	0	0	0	11	0	101
GB	Weapons Activities (RD&T)	0	667	154	0	0	0	106	0	927
	All Other B & R's............ ..	0	448	104	0	0	0	71	0	623
	TOTAL Sandia - Tonopah.....................	0	1,189	274	0	0	0	188	0	1,651
	TOTAL SANDIA............	895	10,216	1,807	499	2,005	933	1,834	19,095	37,284

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-->	SANDIA NATIONAL LAB - ALBUQUERQUE											
GA	Fissile Material Disposition	0	0	0	0	0	0	0	0	0	0	750
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	1,656
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	15,476
GD	Nuclear Safeguards & Security	0	603	0	7	0	71	681	0	0	0	8,706
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	0	0	0	0	0
	All Other B & R's................	0	180	0	70	120	0	370	0	0	0	4,948
	TOTAL Sandia - Albuquerque......................	0	783	0	77	120	71	1,051	0	0	0	31,534
-->	SANDIA NATIONAL LAB - CALIFORNIA											
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	263
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	2,924
	All Other B & R's................	0	27	0	0	11	0	38	0	0	0	2,001
	TOTAL Sandia - California.................. .	0	27	0	0	11	0	38	0	0	0	5,188
-->	SANDIA NATIONAL LAB - TONOPAH TEST RANGE											
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	101
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	927
	All Other B & R's................	0	25	0	0	0	0	25	0	0	0	648
	TOTAL Sandia - Tonopah.....................	0	25	0	0	0	0	25	0	0	0	1,676
	TOTAL SANDIA...................................... ..	0	835	0	77	131	71	1,114	0	0	0	38,398

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	SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
-->	TRANSPORTATION SAFEGUARDS DIVISION										
	GB	Stockpile Management and Support	0	0	0	75,000	0	0	0	0	75,000
		All Other B & R's................	0	0	0	0	0	0	0	0	0
			0	0	0	75,000	0	0	0	0	75,000
-->	WASTE ISOLATION PILOT PLANT										
	EW-31	Waste Management - Defense	213	1,487	95	0	67	95	0	0	1,957
		All Other B & R's................	0	0	0	0	0	0	0	0	0
			213	1,487	95	0	67	95	0	0	1,957
-->	GRAND TOTAL, ALBUQUERQUE OPS. OFFICE....		19,237	71,051	6,242	76,401	9,586	21,161	9,671	26,543	239,892

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
-->	TRANSPORTATION SAFEGUARDS DIVISION											
	GB Stockpile Management and Support	0	0	3,000	0	0	0	3,000	0	0	0	78,000
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
		0	0	3,000	0	0	0	3,000	0	0	0	78,000
-->	WASTE ISOLATION PILOT PLANT											
	EW-31 Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	1,957
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	1,957
-->	GRAND TOTAL, ALBUQUERQUE OPS. OFFICE.....	63	989	3,000	82	161	679	4,974	0	15,000	15,000	259,866

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
-->	ROCKY FLATS PLANT									
EW	Env Restor & Waste Mgmt-Defense	2,286	10,067	5,517	65	1,639	1,496	3,468	50	24,588
GB	Stockpile Management and Support	2,019	26,674	1,126	0	360	299	6,914	147	37,539
GH	Security Investigations	0	0	0	0	0	1,489	0	0	1,489
	All Other B & R's................	0	0	0	0	0	0	0	0	0
-->	GRAND TOTAL, ROCKY FLATS..............................	4,305	36,741	6,643	65	1,999	3,284	10,382	197	63,616

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
-->	ROCKY FLATS PLANT											
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	2,100	2,100	26,688
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	37,539
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	1,489
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
-->	GRAND TOTAL, ROCKY FLATS..............................	0	0	0	0	0	0	0	0	2,100	2,100	65,716

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
-->	CHICAGO OPERATIONS OFFICE									
GD	Nuclear Safeguards & Security	1,532	0	0	0	0	0	0	0	1,532
GH	Security Investigations	0	0	0	0	0	361	0	0	361
	All Other B & R's................	0	0	0	0	0	0	0	0	0
	TOTAL Chicago........................ .. .	1,532	0	0	0	0	361	0	0	1,893
-->	AMES LABORATORY									
EW-40	Technology Development	1	21	2	0	5	0	0	0	29
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0
KC	Basic Energy Sciences	4	95	8	0	19	0	4	0	130
	All Other B & R's................	1	28	2	0	6	0	0	0	37
	TOTAL Ames..... . .	6	144	12	0	30	0	4	0	196

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
-->	CHICAGO OPERATIONS OFFICE											
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	1,532
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	361
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Chicago..............................	0	0	0	0	0	0	0	0	0	0	1,893
-->	AMES LABORATORY											
EW-40	Technology Development	0	0	0	0	0	0	0	0	0	0	29
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	0
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	130
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	37
	TOTAL Ames..............................	0	0	0	0	0	0	0	0	0	0	196

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account	Total Research & Develop	TOTAL OPERATING EXPENSES
-->	ARGONNE NATIONAL LABORATORY - EAST									
AF	Nuclear Energy R&D	62	675	55	0	44	101	164	0	1,101
AT	Magnetic Fusion	3	41	3	0	3	6	10	0	66
EW	Env Restor & Waste Mgmt-Defense	21	225	18	0	15	34	54	0	367
EX	Env Res & Waste Mgmt - Nondefense	17	195	15	0	12	28	47	0	314
GD	Nuclear Safeguards & Security	0	0	0	0	0	283	0	91	374
KA	High Energy Physics	4	52	4	0	4	7	13	0	84
KB	Nuclear Physics	8	91	8	0	6	14	23	0	150
KC	Basic Energy Sciences	53	596	47	0	38	89	144	0	967
KP	Biological & Environ Research	7	82	7	0	5	10	20	0	131
	All Other B & R's	84	933	75	0	61	139	227	0	1,519
	Subtotal Argonne - East	259	2,890	232	0	188	711	702	91	5,073
-->	ARGONNE NATIONAL LABORATORY - WEST									
AF	Nuclear Energy R&D	193	4,042	504	123	246	160	834	0	6,102
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	73	73
EW	Env Restor & Waste Mgmt-Defense	4	55	12	3	6	5	20	0	105
EX	Env Res & Waste Mgmt - Nondefense	3	43	9	3	4	3	16	0	81
	All Other B & R's	34	394	68	21	44	27	144	0	752
	Subtotal Argonne - West	234	4,534	613	150	300	195	1,014	73	7,113
-->	TOTAL ANL EAST & WEST	493	7,424	845	150	488	906	1,716	164	12,186

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-->		ARGONNE NATIONAL LABORATORY - EAST											
	AF	Nuclear Energy R&D	0	0	0	0	0	0	0	0	0	0	1,101
	AT	Magnetic Fusion	0	0	0	0	0	0	0	0	0	0	66
	EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	367
	EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	314
	GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	374
	KA	High Energy Physics	0	0	0	0	0	0	0	0	0	0	84
	KB	Nuclear Physics	0	0	0	0	0	0	0	0	0	0	150
	KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	967
	KP	Biological & Environ. Research	0	0	0	0	0	0	0	0	0	0	131
		All Other B & R's................	0	0	0	0	0	0	0	0	0	0	1,519
		Subtotal Argonne - East	0	0	0	0	0	0	0	0	0	0	5,073
-->		ARGONNE NATIONAL LABORATORY - WEST											
	AF	Nuclear Energy R&D	0	0	0	0	0	0	0	0	0	0	6,102
	GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	73
	EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	105
	EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	81
		All Other B & R's................	0	0	0	0	0	0	0	0	0	0	752
		Subtotal Argonne - West......................	0	0	0	0	0	0	0	0	0	0	7,113
-->		TOTAL ANL EAST & WEST.............	0	0	0	0	0	0	0	0	0	0	12,186

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-->	BROOKHAVEN NATIONAL LABORATORY										
	EW	Env Restor & Waste Mgmt-Defense	0	71	0	0	0	0	0	0	71
	EX	Env Res & Waste Mgmt - Nondefense	10	125	0	0	0	0	12	0	147
	GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	402	402
	KA	High Energy Physics	76	582	53	0	22	0	64	0	797
	KB	Nuclear Physics	18	235	12	0	0	0	21	0	286
	KC	Basic Energy Sciences	101	1,678	69	0	29	10	163	0	2,050
	KP	Biological & Environ. Research	35	317	28	0	12	0	28	0	420
		All Other B & R's................	281	1,361	187	0	119	80	184	0	2,212
		TOTAL Brookhaven National Lab......	521	4,369	349	0	182	90	472	402	6,385
-->	FERMI NATIONAL LABORATORY										
	KA	High Energy Physics	129	1,902	158	0	221	0	23	0	2,433
		All Other B & R's......	0	0	0	0	0	0	0	0	0
		TOTAL Fermi National Laboratory.....	129	1,902	158	0	221	0	23	0	2,433
-->	NEW BRUNSWICK LABORATORY										
	GD	Nuclear Safeguards & Security	0	0	0	0	0	0	4,088	0	4,088
		TOTAL New Brunswick Laboratory....... .	0	0	0	0	0	0	4,088	0	4,088
-->	PRINCETON PLASMA PHYSICS LABORATORY										
	AT	Magnetic Fusion	280	518	0	0	0	0	0	0	798
	EX	Env Res & Waste Mgmt - Nondefense	16	30	0	0	0	0	0	0	46
		All Other B & R's............. ..	4	6	0	0	0	0	0	0	10
		TOTAL Princeton Plasma Phys Lab	300	554	0	0	0	0	0	0	854
-->	GRAND TOTAL, CHICAGO OPS. OFFICE.		2,981	14,393	1,364	150	921	1,357	6,303	566	28,035

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-->	BROOKHAVEN NATIONAL LABORATORY											
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	71
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	147
GD	Nuclear Safeguards & Security	0	0	0	0	0	25	25	0	0	0	427
KA	High Energy Physics	0	36	0	0	0	0	36	0	0	0	833
KB	Nuclear Physics	0	0	0	0	0	0	0	0	0	0	286
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	2,050
KP	Biological & Environ. Research	0	0	0	0	0	0	0	0	0	0	420
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	2,212
	TOTAL Brookhaven National Lab......	0	36	0	0	0	25	61	0	0	0	6,446
-->	FERMI NATIONAL LABORATORY											
KA	High Energy Physics	55	100	0	0	0	0	155	0	0	0	2,588
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Fermi National Laboratory......................	55	100	0	0	0	0	155	0	0	0	2,588
-->	NEW BRUNSWICK LABORATORY											
GD	Nuclear Safeguards & Security	0	0	0	0	0	207	207	0	0	0	4,295
	TOTAL New Brunswick Laboratory.........	0	0	0	0	0	207	207	0	0	0	4,295
-->	PRINCETON PLASMA PHYSICS LABORATORY											
AT	Magnetic Fusion	0	0	0	0	0	0	0	0	0	0	798
EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	46
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	10
	TOTAL Princeton Plasma Phys. Lab...	0	0	0	0	0	0	0	0	0	0	854
-->	GRAND TOTAL, CHICAGO OPS. OFFICE..........	55	136	0	0	0	232	423	0	0	0	26,458

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DEPARTMENT OF ENERGY
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Operating Expenses - Activity Summaries
(In Thousands)

	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
-->	GOLDEN FIELD OFFICE (NREL)									
	EB Solar Energy	62	463	190	0	111	18	0	0	844
	KC Basic Energy Sciences	1	11	6	0	2	1	0	0	21
-->	GRAND TOTAL, GOLDEN FIELD OFFICE......	63	474	196	0	113	19	0	0	865

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Capital Equipment and Construction - Activity Summaries
(In Thousands)

SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
--> GOLDEN FIELD OFFICE (NREL)												
EB	Solar Energy	0	27	0	0	0	0	27	0	0	0	871
KC	Basic Energy Sciences	0	1	0	0	0	0	1	0	0	0	22
--> GRAND TOTAL, GOLDEN FIELD OFFICE......		0	28	0	0	0	0	28	0	0	0	893

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Operating Expenses - Activity Summaries
(In Thousands)

	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
-->	IDAHO OPERATIONS OFFICE									
EW-70	Facility Transition & Management	2,011	0	109	0	139	954	22	0	3,235
GH	Security Investigations	0	0	0	0	0	673	0	0	673
	All Other B & R's................	0	0	0	0	0	0	0	0	0
	TOTAL Idaho Ops. Office........... ..	2,011	0	109	0	139	1,627	22	0	3,908
-->	LOCKHEED TECHNOLOGIES COMPANY-IDAHO									
AJ	Naval Reactors	56	2,820	144	0	60	68	34	0	3,182
EW	Env Restor & Waste Mgmt-Defense	419	7,162	1,065	0	440	507	258	0	9,851
GB	Weapons Activities (RD&T)	4	52	11	0	5	6	2	200	280
GD	Nuclear Safeguards & Security	827	0	0	0	0	0	0	0	827
GE	Materials Support	11	3,235	2,578	0	597	914	850	225	8,410
	All Other B & R's................	85	1,663	213	0	89	102	52	0	2,204
	TOTAL Lockheed-Idaho... .	1,402	14,932	4,011	0	1,191	1,597	1,196	425	24,754
-->	GRAND TOTAL, IDAHO OPS. OFFICE	3,413	14,932	4,120	0	1,330	3,224	1,218	425	28,662

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(In Thousands)

	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
-->	IDAHO OPERATIONS OFFICE											
EW-70	Facility Transition & Management	0	0	0	0	0	0	0	0	0	0	3,235
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	673
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Idaho Ops. Office................	0	0	0	0	0	0	0	0	0	0	3,908
-->	LOCKHEED TECHNOLOGIES COMPANY-IDAHO											
AJ	Naval Reactors	0	0	0	0	0	0	0	0	0	0	3,182
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	320	0	320	0	966	966	11,157
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	280
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	827
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	8,410
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	2,204
	TOTAL Lockheed-Idaho................	0	0	0	0	320	0	320	0	966	966	26,060
-->	GRAND TOTAL, IDAHO OPS. OFFICE..................	0	0	0	0	320	0	320	0	966	966	29,968

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(In Thousands)

		SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect. Forces	Total Physical Protect Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop	TOTAL OPERATING EXPENSES
-->	NEVADA OPERATIONS OFFICE										
	GB	Weapons Activities (RD&T)	3,575	0	0	0	0	0	0	0	3,575
	GH	Security Investigations	0	0	0	0	0	762	0	0	762
	NT	Intelligence	0	0	1,400	0	0	0	0	0	1,400
		All Other B & R's...	0	0	0	0	0	0	0	0	0
		TOTAL Nevada..	3,575	0	1,400	0	0	762	0	0	5,737
-->	EG&G/EM										
	EW	Env Restor & Waste Mgmt-Defense	17	0	31	0	25	12	0	0	85
	GB	Weapons Activities (RD&T)	299	2	599	0	928	220	0	0	2,048
	GC	Nonproliferation & Verif R&D	17	0	33	0	27	12	0	0	89
	GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0
	GJ	Arms Control & Nonproliferation	2	0	7	0	6	2	0	0	17
	NT	Intelligence	16	0	27	0	23	10	0	0	76
		All Other B & R's.. . . .	108	0	214	0	174	78	0	0	574
		TOTAL EG&G\EM.	459	2	911	0	1,183	334	0	0	2,889
-->	RAYTHEON SERVICES NEVADA										
	GB	Weapons Activities (RD&T)	0	0	630	0	0	0	0	0	630
	NT	Intelligence	0	0	0	0	0	0	0	0	0
		All Other B & R's.. . . .	0	0	0	0	0	0	0	0	0
		TOTAL Raytheon Services Nevada	0	0	630	0	0	0	0	0	630

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Capital Equipment and Construction - Activity Summaries
(In Thousands)

	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
-->	NEVADA OPERATIONS OFFICE											
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	3,575
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	762
NT	Intelligence	0	0	0	0	0	0	0	0	0	0	1,400
	All Other B & R's.................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Nevada......................	0	0	0	0	0	0	0	0	0	0	5,737
-->	EG&G/EM											
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	86
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	2,048
GC	Nonproliferation & Verif. R&D	0	0	0	0	0	0	0	0	0	0	68
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	0
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	0	0	0	0	17
NT	Intelligence	0	0	0	0	0	0	0	0	0	0	76
	All Other B & R's.................	0	0	0	0	0	0	0	0	0	0	574
	TOTAL EG&G\EM....................	0	0	0	0	0	0	0	0	0	0	2,869
-->	RAYTHEON SERVICES NEVADA											
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	630
NT	Intelligence	0	0	0	0	0	0	0	0	0	0	0
	All Other B & R's.................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Raytheon Services Nevada....	0	0	0	0	0	0	0	0	0	0	630

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(In Thousands)

	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop	TOTAL OPERATING EXPENSES
-->	REYNOLDS ELECTRICAL & ENG. CO., INC.									
DB	Waste Management System	30	89	0	0	102	163	0	0	384
EW	Env Restor & Waste Mgmt-Defense	0	13	0	0	15	25	0	0	53
GB	Weapons Activities (RD&T)	220	51	3,200	200	60	92	0	210	4,033
	All Other B & R's............ ..	0	67	0	0	73	120	0	0	260
	TOTAL Reynolds Elect. & Eng. ..	250	220	3,200	200	250	400	0	210	4,730
-->	WACKENHUT SERVICES INC.									
DB	Waste Management System	242	1,004	0	0	0	77	0	0	1,323
EW-31	Waste Management - Defense	107	444	0	0	0	34	0	0	585
GB	Weapons Activities (RD&T)	2,861	11,860	0	0	0	906	0	0	15,627
	All Other B & R's	158	657	0	0	0	51	0	0	866
	TOTAL Wackenhut Services Inc. .	3,368	13,965	0	0	0	1,068	0	0	18,401
-->	GRAND TOTAL, NEVADA OPS OFFICE..	7,652	14,187	6,141	200	1,433	2,564	0	210	32,387

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Transportation	Total Information Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUCTION	TOTAL SAFEGUARDS & SECURITY
-->	REYNOLDS ELECTRICAL & ENG. CO., INC.											
DB	Waste Management System	0	0	0	0	0	0	0	0	0	0	384
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	53
GB	Weapons Activities (RD&T)	0	0	0	0	0	0	0	0	0	0	4,033
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	260
	TOTAL Reynolds Elect. & Eng.	0	0	0	0	0	0	0	0	0	0	4,730
-->	WACKENHUT SERVICES INC.											
DB	Waste Management System	0	0	0	0	0	0	0	0	0	0	1,323
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	585
GB	Weapons Activities (RD&T)	53	0	0	0	0	0	53	0	0	0	15,680
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	866
	TOTAL Wackenhut Services Inc. ..	53	0	0	0	0	0	53	0	0	0	18,454
-->	GRAND TOTAL, NEVADA OPS. OFFICE	53	0	0	0	0	0	53	0	0	0	32,440

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
-->	OAKLAND OPERATIONS OFFICE									
GB	Weapons Activities (RD&T)	1,094	0	40	0	836	1,418	25	0	3,413
GH	Security Investigations	0	0	0	0	0	1	0	0	1
WM-60	General Admin. Contractual Serv.	0	570	75	0	0	0	0	0	645
	All Other B & R's................	0	0	0	0	0	0	0	0	0
	TOTAL Oakland Ops. Office..............	1,094	570	115	0	836	1,419	25	0	4,059
-->	LAWRENCE BERKELEY LABORATORY (LBL)									
EC	Buildings Sector - EERE	3	70	6	0	0	0	0	0	79
EX	Env Res & Waste Mgmt - Nondefense	4	119	9	0	0	0	0	0	132
KA	High Energy Physics	5	129	9	0	0	0	0	0	143
KB	Nuclear Physics	2	60	8	0	0	0	0	0	70
KC	Basic Energy Sciences	12	307	22	0	0	0	0	0	341
KP	Biological & Environmental Res.	5	113	10	0	0	0	0	0	128
	All Other B & R's................	6	138	11	0	0	0	0	0	155
	TOTAL Lawrence Berkeley Lab............	37	936	75	0	0	0	0	0	1,048

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		SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
-->		OAKLAND OPERATIONS OFFICE											
	GB	Weapons Activities (RD&T)	0	0	0	27	0	0	27	0	0	0	3,440
	GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	1
	WM-60	General Admin. Contractual Serv.	0	0	0	0	0	0	0	0	0	0	645
		All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
,		TOTAL Oakland Ops. Office..............	0	0	0	27	0	0	27	0	0	0	4,086
-->		LAWRENCE BERKELEY LABORATORY (LBL)											
	EC	Buildings Sector - EERE	0	0	0	0	0	0	0	0	0	0	79
	EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	132
	KA	High Energy Physics	0	0	0	0	0	0	0	0	0	0	143
	KB	Nuclear Physics	0	0	0	0	0	0	0	0	0	0	70
	KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	341
	KP	Biological & Environmental Res.	0	0	0	0	0	0	0	0	0	0	128
		All Other B & R's................	0	0	0	0	0	0	0	0	0	0	155
		TOTAL Lawrence Berkeley Lab....	0	0	0	0	0	0	0	0	0	0	1,048

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
-->	LAWRENCE LIVERMORE NATL. LAB. (LLNL)									
AT	Magnetic Fusion	81	342	196	0	90	85	59	0	853
DB	Waste Management System	61	257	146	0	68	64	44	0	640
EW	Env Restor & Waste Mgmt-Defense	201	840	479	0	219	207	145	0	2,091
GA	Fissile Materials Disposition	0	0	0	0	0	0	0	450	450
GB	Weapons Activities (RD&T)	1,395	5,839	3,333	0	1,523	1,442	3,215	0	16,747
GC	Nonproliferation & Verif. R&D	147	623	355	0	162	153	107	0	1,547
GD	Nuclear Safeguards & Security	180	0	0	0	0	0	0	3,039	3,219
GH	Security Investigations	0	0	0	0	0	5,000	0	0	5,000
GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	2,600	0	2,600
KC	Basic Energy Sciences	88	372	212	0	98	93	64	0	927
KP	Biological & Environmental Res.	72	304	175	0	80	75	53	0	759
	All Other B & R's................	439	1,837	1,050	0	479	454	317	0	4,576
	TOTAL Lawrence Livermore Lab...........	2,664	10,414	5,946	0	2,719	7,573	6,604	3,489	39,409
-->	STANFORD LINEAR ACCELERATOR									
EX	Env Res & Waste Mgmt - Nondefense	0	32	0	0	0	0	0	0	32
KA	High Energy Physics	0	723	0	0	0	0	0	0	723
KC	Basic Energy Sciences	0	97	0	0	0	0	0	0	97
	All Other B & R's................	0	16	0	0	0	0	0	0	16
	TOTAL Stanford Linear Accelerator........	0	868	0	0	0	0	0	0	868
-->	GRAND TOTAL, OAKLAND OPERATIONS OFFICE.......	3,795	12,788	6,136	0	3,555	8,992	6,629	3,489	45,384

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		SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
-->	LAWRENCE LIVERMORE NATL. LAB. (LLNL)												
	AT	Magnetic Fusion	0	10	0	0	0	0	10	0	0	0	863
	DB	Waste Management System	0	8	0	0	0	0	8	0	0	0	648
	EW	Env Restor & Waste Mgmt-Defense	1	26	0	0	0	0	27	0	0	0	2,118
	GA	Fissile Materials Disposition	0	0	0	0	0	0	0	0	0	0	450
	GB	Weapons Activities (RD&T)	5	178	0	0	0	0	183	0	0	0	16,930
	GC	Nonproliferation & Verif. R&D	1	19	0	0	0	0	20	0	0	0	1,567
	GD	Nuclear Safeguards & Security	90	0	0	0	0	0	90	0	0	0	3,309
	GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	5,000
	GJ	Arms Control & Nonproliferation	0	0	0	0	0	0	0	0	0	0	2,600
	KC	Basic Energy Sciences	0	11	0	0	0	0	11	0	0	0	938
	KP	Biological & Environmental Res.	0	9	0	0	0	0	9	0	0	0	768
		All Other B & R's.................	2	56	0	0	0	0	58	0	0	0	4,634
		TOTAL Lawrence Livermore Lab.....	99	317	0	0	0	0	416	0	0	0	39,825
-->	STANFORD LINEAR ACCELERATOR												
	EX	Env Res & Waste Mgmt - Nondefense	0	0	0	0	0	0	0	0	0	0	32
	KA	High Energy Physics	0	0	0	0	0	0	0	0	0	0	723
	KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	97
		All Other B & R's.................	0	0	0	0	0	0	0	0	0	0	16
		TOTAL Stanford Linear Accelerator..........	0	0	0	0	0	0	0	0	0	0	868
-->	GRAND TOTAL, OAKLAND OPERATIONS OFFICE.......		99	317	0	27	0	0	443	0	0	0	45,827

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop	TOTAL OPERATING EXPENSES
-->	OAK RIDGE OPERATIONS OFFICE									
AF 99	Oak Ridge Landlord (NE)	0	1,205	32	0	247	0	0	0	1,484
GB	Stockpile Management and Support	2,323	522	0	0	169	810	0	0	3,824
GH	Security Investigations	0	0	0	0	0	5,299	0	0	5,299
WA	General Admin. - Program Dir.	0	0	0	0	0	270	0	0	270
	All Other B & R's	0	0	0	0	0	135	0	0	135
	TOTAL Oak Ridge Ops. Office	2,323	1,727	32	0	416	6,514	0	0	11,012
-->	CONTINUOUS ELECTRON BEAM ACCELER FACIL.									
KB	Nuclear Physics	0	402	0	0	50	0	0	0	452
	All Other B & R's	0	0	0	0	0	0	0	0	0
	TOTAL Continuous Electron Facil.	0	402	0	0	50	0	0	0	452
-->	K-25 SITE									
EW-20	Environmental Restoration - Defense	307	4,446	303	57	779	536	431	0	6,859
EW-31	Waste Management - Defense	97	594	60	14	259	154	53	0	1,231
	All Other B & R's	51	319	32	14	142	84	30	0	672
	TOTAL K-25 Site	455	5,359	395	85	1,180	774	514	0	8,762
-->	CENTRAL									
GD	Nuclear Safeguards and Security	213	0	0	0	0	0	0	804	1,017
	All Other B&R's	0	0	0	0	0	0	0	0	0
	TOTAL Central	213	0	0	0	0	0	0	804	1,017

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
-->	OAK RIDGE OPERATIONS OFFICE											
AF 99	Oak Ridge Landlord (NE)	0	35	0	0	0	0	35	0	0	0	1,519
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	3,824
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	5,299
WA	General Admin. - Program Dir.	0	0	0	0	0	0	0	0	0	0	270
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	135
	TOTAL Oak Ridge Ops. Office........	0	35	0	0	0	0	35	0	0	0	11,047
-->	CONTINUOUS ELECTRON BEAM ACCELER FACIL.											
KB	Nuclear Physics	0	0	0	50	0	0	50	0	0	0	502
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Continuous Electron Facil....	0	0	0	50	0	0	50	0	0	0	502
-->	K-25 SITE											
EW-20	Environmental Restoration - Defense	0	0	0	0	0	0	0	0	0	0	6,859
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	1,231
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	672
	TOTAL K-25 Site.....................	0	0	0	0	0	0	0	0	0	0	8,762
-->	CENTRAL											
GD	Nuclear Safeguards and Security	93	0	0	0	0	0	93	0	0	0	1,110
	All Other B&R's..................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Central........... ...	93	0	0	0	0	0	93	0	0	0	1,110

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SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop	TOTAL OPERATING EXPENSES
-->	OAK RIDGE INSTIT. FOR SCIENCE & EDUC. (ORISE)									
GD	Nuclear Safeguards & Security	0	0	0	0	0	563	0	0	563
GH	Security Investigations	0	0	0	0	0	200	0	0	200
KG	Multi-Prgm Enrgy Lab - Fac Sup	0	0	0	0	0	0	0	0	0
	All Other B & R's.	0	120	0	0	0	28	0	0	148
	TOTAL ORISE.......	0	120	0	0	0	791	0	0	911
-->	OAK RIDGE NATIONAL LABORATORY (ORNL)									
AF	Nuclear Energy Research & Develop.	27	137	21	0	25	44	11	0	265
AK	Electric Energy Systems	27	137	21	0	25	44	11	0	265
AT	Magnetic Fusion	45	224	35	1	41	75	18	0	439
EE	Transportation Sector	45	224	35	1	41	75	18	0	439
EW-20	Environmental Restoration - Defense	54	269	42	1	50	90	22	0	528
EW-31	Waste Management - Defense	74	363	56	1	67	121	30	0	712
EW-40	Technology Development	46	233	35	1	43	76	18	0	452
EX-20	Environmental Restoration - Nondef	46	233	35	1	43	76	18	0	452
EX-31	Waste Management - Nondefense	27	137	21	0	25	44	11	0	265
KC	Basic Energy Sciences	134	631	99	2	116	212	51	0	1,245
KE	Advanced Neutron Source	27	137	21	0	25	44	11	0	265
KP	Biological & Environ. Research	45	224	35	1	41	75	18	0	439
	All Other B & R's	237	1,052	163	4	198	364	91	0	2,109
	TOTAL Oak Ridge National Lab	834	4,001	619	13	740	1,340	328	0	7,875

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
-->	OAK RIDGE INSTIT. FOR SCIENCE & EDUC. (ORISE)											
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	563
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	200
KG	Multi-Prgm Enrgy Lab - Fac Sup	0	0	0	0	0	0	0	105	0	105	105
	All Other B & R's..........	0	0	0	0	0	0	0	0	0	0	148
	TOTAL ORISE......................	0	0	0	0	0	0	0	105	0	105	1,016
-->	OAK RIDGE NATIONAL LABORATORY (ORNL)											
AF	Nuclear Energy Research & Develop.	0	0	0	0	0	0	0	0	0	0	265
AK	Electric Energy Systems	0	0	0	0	0	0	0	0	0	0	265
AT	Magnetic Fusion	0	0	0	0	0	0	0	0	0	0	439
EE	Transportation Sector	0	0	0	0	0	0	0	0	0	0	439
EW-20	Environmental Restoration - Defense	0	0	0	0	0	0	0	0	0	0	528
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	712
EW-40	Technology Development	0	0	0	0	0	0	0	0	0	0	452
EX-20	Environmental Restoration - Nondef	0	0	0	0	0	0	0	0	0	0	452
EX-31	Waste Management - Nondefense	0	0	0	0	0	0	0	0	0	0	265
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	1,245
KE	Advanced Neutron Source	0	0	0	0	0	0	0	0	0	0	265
KP	Biological & Environ. Research	0	0	0	0	0	0	0	0	0	0	439
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	2,109
	TOTAL Oak Ridge National Lab	0	0	0	0	0	0	0	0	0	0	7,875

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
-->	PADUCAH GASEOUS DIFFUSION PLANT									
	CD Uranium Programs	99	295	141	0	309	309	0	0	1,153
	EU-20 Uranium Enrichment Decont. & Decom.	255	689	328	0	328	328	0	0	1,928
	TOTAL Paducah Gaseous Diff. Plant .	354	984	469	0	637	637	0	0	3,081
-->	PORTSMOUTH GASEOUS DIFFUSION PLANT									
	CD Uranium Programs	224	1,915	117	0	990	283	2,445	0	5,974
	EU-20 Uranium Enrichment Decont. & Decom.	209	1,698	155	0	93	192	165	0	2,512
	All Other B & R's................	0	142	0	0	0	0	0	0	142
	TOTAL Portsmouth Gas. Diff. Plant .	433	3,755	272	0	1,083	475	2,610	0	8,628
-->	Y-12 PLANT									
	EW-20 Environmental Restoration - Defense	66	177	74	1	84	99	70	0	571
	EW-31 Waste Management - Defense	63	177	70	1	78	95	67	0	551
	GB Stockpile Management and Support	629	17,897	4,982	102	2,815	967	6,608	0	34,000
	GD Nuclear Safeguards & Security	0	0	0	0	0	0	1,758	1,066	2,824
	GE Materials Support	14	390	106	2	63	20	144	0	739
	All Other B & R's................	58	160	64	2	75	88	62	0	509
	TOTAL Y-12 Plant.....	830	18,801	5,296	108	3,115	1,269	8,709	1,066	39,194
-->	GRAND TOTAL, OAK RIDGE OPS. OFFICE	5,442	35,149	7,083	206	7,221	11,800	12,161	1,870	80,932

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-->	PADUCAH GASEOUS DIFFUSION PLANT											
CD	Uranium Programs	0	0	0	0	0	0	0	0	0	0	1,153
EU-20	Uranium Enrichment Decont. & Decom.	0	0	0	0	0	0	0	0	0	0	1,928
	TOTAL Paducah Gaseous Diff. Plant .	0	0	0	0	0	0	0	0	0	0	3,081
-->	PORTSMOUTH GASEOUS DIFFUSION PLANT											
CD	Uranium Programs	0	0	0	0	0	0	0	0	700	700	6,674
EU-20	Uranium Enrichment Decont. & Decom.	0	0	0	0	0	0	0	0	0	0	2,512
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	142
	TOTAL Portsmouth Gas. Diff. Plant .	0	0	0	0	0	0	0	0	700	700	9,328
-->	Y-12 PLANT											
EW-20	Environmental Restoration - Defense	0	0	0	0	0	0	0	0	0	0	571
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	551
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	34,000
GD	Nuclear Safeguards & Security	40	0	0	0	0	0	40	0	0	0	2,864
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	739
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	509
	TOTAL Y-12 Plant............	40	0	0	0	0	0	40	0	0	0	39,234
-->	GRAND TOTAL, OAK RIDGE OPS OFFICE	133	35	0	50	0	0	218	105	700	805	81,955

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--> OHIO FIELD OFFICE										
--> FERMC (Fernald Env. Rest. Manag. Corp.)										
EW	Env Restor & Waste Mgmt-Defense	0	1,710	0	0	0	0	649	0	2,359
GE	Materials Support	0	0	0	0	0	0	275	0	275
	All Other B & R's................	0	0	0	0	0	0	0	0	0
	TOTAL FERMC........................	0	1,710	0	0	0	0	924	0	2,634
--> MOUND LABORATORY (DAYTON)										
EW	Env Restor & Waste Mgmt-Defense	209	1,187	504	0	232	130	314	0	2,578
GB	Stockpile Management and Support	462	2,642	1,122	0	515	289	699	0	5,729
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	905	905
	All Other B & R's................	0	0	0	0	0	0	0	0	0
	TOTAL Mound...........................	671	3,829	1,626	0	747	419	1,013	905	9,210
-> WEST VALLEY										
EX-33	West Valley Demonstration Project	357	924	56	0	0	0	0	0	1,337
	All Other B & R's................	0	0	0	0	0	0	0	0	0
	TOTAL West Valley	357	924	56	0	0	0	0	0	1,337
--> GRAND TOTAL, OHIO FIELD OFFICE		1,028	6,463	1,682	0	747	419	1,937	905	13,181

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-->	OHIO FIELD OFFICE											
-->	FERMC (Fernald Env. Rest. Manag. Corp.)											
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	100	0	100	2,459
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	275
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL FERMC......	0	0	0	0	0	0	0	100	0	100	2,734
-->	MOUND LABORATORY (DAYTON)											
EW	Env Restor & Waste Mgmt-Defense	0	0	0	0	0	0	0	0	0	0	2,578
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	5,729
GD	Nuclear Safeguards & Security	68	0	0	0	0	0	68	0	0	0	973
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Mound........................ ...	68	0	0	0	0	0	68	0	0	0	9,278
-->	WEST VALLEY											
EX-33	West Valley Demonstration Project	0	0	0	0	0	0	0	0	0	0	1,337
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL West Valley	0	0	0	0	0	0	0	0	0	0	1,337
-->	GRAND TOTAL, OHIO FIELD OFFICE	68	0	0	0	0	0	68	100	0	100	13,349

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
-->	OFFICE OF SCIENTIFIC & TECHNICAL INFO.									
GD	Nuclear Safeguards & Security	0	0	0	0	30	0	0	0	30
LA	Technical Infor. Mgmt Program	46	145	28	0	544	20	0	0	783
	All Other B & R's................	0	0	0	0	0	0	0	0	0
-->	GRAND TOTAL, OFF. SCE. & TECH. INFO.	46	145	28	0	574	20	0	0	813

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	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
-->	OFFICE OF SCIENTIFIC & TECHNICAL INFO.											
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	30
LA	Technical Infor Mgmt Program	0	0	0	0	0	0	0	0	0	0	783
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
-->	GRAND TOTAL, OFF. SCE. & TECH. INFO.	0	0	0	0	0	0	0	0	0	0	813

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--> RICHLAND OPERATIONS OFFICE										
AF	Nuclear Energy R&D	72	289	34	0	36	97	16	0	544
EC	Buildings Sector	17	11	17	0	9	8	9	0	71
ED	Industrial Sector	11	8	12	0	6	5	6	0	48
EE	Transportation Sector	10	7	11	0	6	5	5	0	44
EW-20	Environmental Restoration	21	15	22	0	12	10	11	0	91
EW-31	Waste Management - Defense	1,281	8,825	2,491	0	427	356	854	0	14,234
EW-40	Technology Development	115	457	54	0	58	154	25	0	863
EW-50	Transportation Management	24	101	11	0	12	34	6	0	188
EW-70	Facility Trans. & Mgmt. - Def.	4,636	42	849	0	1,382	0	1,415	0	8,324
EX-31	Waste Management - Non-Defense	22	15	23	0	12	11	11	0	94
EX-70	Facility Transition & Management	136	1,690	742	0	0	0	102	0	2,670
GC	Nonproliferation & Verif. R&D	31	21	32	0	18	14	16	0	132
GD	Nuclear Safeguards & Security	1,672	0	0	0	2,056	0	0	302	4,030
GE	Materials Support	243	7,816	1,772	74	0	0	643	0	10,548
GH	Security Investigations	0	0	0	0	0	908	0	0	908
HA	Environment, Safety & Health	0	0	0	0	0	0	0	0	0
KC	Basic Energy Sciences	25	17	25	0	14	11	13	0	105
KP	Biological & Environ. Research	75	50	76	0	42	35	37	0	315
KU	ER Lab. Tech. Transfer	25	17	25	0	14	11	13	0	105
	All Other B & R's................	93	231	65	0	48	87	31	0	555
	TOTAL Richland Operations Office	8,509	19,612	6,261	74	4,152	1,746	3,213	302	43,869

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-->	RICHLAND OPERATIONS OFFICE											
AF	Nuclear Energy R&D	0	0	0	0	0	0	0	0	0	0	544
EC	Buildings Sector	0	0	0	0	0	0	0	0	0	0	71
ED	Industrial Sector	0	0	0	0	0	0	0	0	0	0	48
EE	Transportation Sector	0	0	0	0	0	0	0	0	0	0	44
EW-20	Environmental Restoration	0	0	0	0	0	0	0	0	0	0	91
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	14,234
EW-40	Technology Development	0	0	0	0	0	0	0	0	0	0	863
EW-50	Transportation Management	0	0	0	0	0	0	0	0	0	0	188
EW-70	Facility Trans. & Mgmt. - Def.	0	0	0	0	0	0	0	0	0	0	8,324
EX-31	Waste Management - Non-Defense	0	0	0	0	0	0	0	0	0	0	94
EX-70	Facility Transition & Management	0	0	0	0	0	0	0	0	0	0	2,670
GC	Nonproliferation & Verif. R&D	0	0	0	0	0	0	0	0	0	0	132
GD	Nuclear Safeguards & Security	0	0	0	0	0	0	0	0	0	0	4,030
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	10,548
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	908
HA	Environment, Safety & Health	0	0	0	0	0	0	0	0	0	0	0
KC	Basic Energy Sciences	0	0	0	0	0	0	0	0	0	0	105
KP	Biological & Environ. Research	0	0	0	0	0	0	0	0	0	0	315
KU	ER Lab. Tech. Transfer	0	0	0	0	0	0	0	0	0	0	105
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	555
	TOTAL Richland Operations Office	0	0	0	0	0	0	0	0	0	0	43,869

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—> SAVANNAH RIVER OPERATIONS OFFICE									
EW-31 Waste Management - Defense	0	0	0	0	0	0	0	0	0
EW-70 Landlord	0	0	0	0	0	0	0	0	0
GB Stockpile Management and Support	0	0	0	0	0	0	0	0	0
GE Materials Support	8,259	0	0	0	0	72	1,600	0	9,931
GH Security Investigations	0	0	0	0	0	2,805	0	0	2,805
All Other B & R's................	0	0	0	0	0	0	0	0	0
TOTAL Savannah River...............	8,259	0	0	0	0	2,877	1,600	0	12,736
—> WACKENHUT SERVICES INC.									
EW-31 Waste Management - Defense	319	878	117	0	12	14	0	0	1,340
EW-70 Landlord	0	0	0	0	0	0	0	0	0
GB Stockpile Management and Support	621	1,704	227	0	22	26	0	0	2,600
GE Materials Support	13,569	37,172	4,951	0	479	576	0	0	56,747
All Other B & R's................	0	0	0	0	0	0	0	0	0
TOTAL Wackenhut Services Inc......	14,509	39,754	5,295	0	513	616	0	0	60,687
—> WESTINGHOUSE SAVANNAH RIVER									
EW-31 Waste Management - Defense	296	174	2,099	43	390	500	455	75	4,032
EW-70 Landlord	0	0	0	0	0	0	0	0	0
GB Stockpile Management and Support	159	94	1,124	23	209	268	244	40	2,161
GE Materials Support	1,141	670	8,090	167	1,507	1,924	1,757	286	15,542
All Other B & R's................	20	12	147	3	28	35	32	6	283
TOTAL Westinghouse Savannah Rv...	1,616	950	11,460	236	2,134	2,727	2,488	407	22,018
—> GRAND TOTAL, SAVANNAH RIVER	24,384	40,704	16,755	236	2,647	6,220	4,088	407	95,441

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-->	SAVANNAH RIVER OPERATIONS OFFICE											
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	0
EW-70	Landlord	0	0	0	0	0	0	0	0	0	0	0
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	0
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	9,931
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	2,805
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Savannah River................	0	0	0	0	0	0	0	0	0	0	12,736
-->	WACKENHUT SERVICES INC.											
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	1,340
EW-70	Landlord	0	0	0	0	0	0	0	0	0	0	0
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	2,600
GE	Materials Support	0	0	0	0	0	0	0	0	0	0	56,747
	All Other B & R's................	0	0	0	0	0	0	0	0	0	0	0
	TOTAL Wackenhut Services Inc......	0	0	0	0	0	0	0	0	0	0	60,687
-->	WESTINGHOUSE SAVANNAH RIVER											
EW-31	Waste Management - Defense	0	0	0	0	0	0	0	0	0	0	4,032
EW-70	Landlord	0	0	0	0	0	0	0	0	0	0	0
GB	Stockpile Management and Support	0	0	0	0	0	0	0	0	0	0	2,161
GE	Materials Support	108	1,673	0	0	0	275	2,056	538	0	538	18,136
	All Other B & R's........... . ..	0	0	0	0	0	0	0	0	0	0	283
	TOTAL Westinghouse Savannah Rv ..	108	1,673	0	0	0	275	2,056	538	0	538	24,612
-->	GRAND TOTAL, SAVANNAH RIVER	108	1,673	0	0	0	275	2,056	538	0	538	98,035

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DEPARTMENT OF ENERGY
SAFEGUARDS AND SECURITY ESTIMATES
FY 1995 Col. of FY 1997 Congressional
Operating Expenses - Activity Summaries
(In Thousands)

SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
--> WESTERN AREA POWER ADMIN. (WAPA)									
CF Power Marketing	184	96	404	0	37	39	0	0	760
--> GRAND TOTAL, WAPA	184	96	404	0	37	39	0	0	760
--> BARTLESVILLE PROJECT OFFICE									
AN Energy Tech Ctr Prog. Dir.	178	0	72	0	20	8	0	0	278
All Other B & R's................	0	0	0	0	0	0	0	0	0
--> GRAND TOTAL, BARTLESVILLE................	178	0	72	0	20	8	0	0	278
--> MORGANTOWN ENERGY TECH. CENTER (METC)									
AN Energy Tech Ctr Prog. Dir.	18	522	0	0	55	0	0	0	595
All Other B & R's................	0	0	0	0	0	0	0	0	0
--> GRAND TOTAL, METC........................	18	522	0	0	55	0	0	0	595
--> PITTSBURGH ENERGY TECHN. CENTER (PETC)									
AN Energy Tech Ctr Prog. Dir.	15	645	15	0	0	0	0	0	675
All Other B & R's................	0	0	0	0	0	0	0	0	0
--> GRAND TOTAL, PETC........................	15	645	15	0	0	0	0	0	675
--> NAVAL PETROLEUM AND OIL SHALE RESERVES									
CB Naval Petroleum & Oil Shale Res.	0	1,260	9	0	0	0	0	0	1,269
All Other B & R's................	0	0	0	0	0	0	0	0	0
--> GRAND TOTAL, NAVAL PETRO. & O. S. RES.	0	1,260	9	0	0	0	0	0	1,269
--> STRATEGIC PETROLEUM RESERVES (SPRO)									
SA Strategic Petroleum Reserve	1,382	13,463	0	0	0	113	0	0	14,958
--> GRAND TOTAL, SPRO.......................	1,382	13,463	0	0	0	113	0	0	14,958

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DEPARTMENT OF ENERGY
SAFEGUARDS AND SECURITY ESTIMATES
FY 1995 Col of FY 1997 Congressional
Capital Equipment and Construction - Activity Summaries
(In Thousands)

	SITE/FACILITY/CONTRACTORS		Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
-->	WESTERN AREA POWER ADMIN. (WAPA)												
	CF	Power Marketing	0	0	0	0	0	0	0	0	0	0	760
-->	GRAND TOTAL, WAPA		0	0	0	0	0	0	0	0	0	0	760
-->	BARTLESVILLE PROJECT OFFICE												
	AN	Energy Tech Ctr Prog Dir.	0	0	0	0	0	0	0	0	0	0	278
		All Other B & R's.................	0	0	0	0	0	0	0	0	0	0	0
-->	GRAND TOTAL, BARTLESVILLE.................		0	0	0	0	0	0	0	0	0	0	278
-->	MORGANTOWN ENERGY TECH. CENTER (METC)												
	AN	Energy Tech Ctr Prog. Dir.	0	0	0	0	0	0	0	0	0	0	595
		All Other B & R's............... .	0	0	0	0	0	0	0	0	0	0	0
-->	GRAND TOTAL, METC...............		0	0	0	0	0	0	0	0	0	0	595
-->	PITTSBURGH ENERGY TECHN. CENTER (PETC)												
	AN	Energy Tech Ctr Prog. Dir.	0	0	0	0	0	0	0	0	0	0	675
		All Other B & R's.................	0	0	0	0	0	0	0	0	0	0	0
-->	GRAND TOTAL, PETC.........................		0	0	0	0	0	0	0	0	0	0	675
-->	NAVAL PETROLEUM AND OIL SHALE RESERVES												
	CB	Naval Petroleum & Oil Shale Res.	0	0	0	0	0	0	0	0	0	0	1,269
		All Other B & R's.................	0	0	0	0	0	0	0	0	0	0	0
-->	GRAND TOTAL, NAVAL PETRO. & O. S. RES.		0	0	0	0	0	0	0	0	0	0	1,269
-->	STRATEGIC PETROLEUM RESERVES (SPRO)												
	SA	Strategic Petroleum Reserve	0	0	0	0	0	0	0	0	0	0	14,958
-->	GRAND TOTAL, SPRO..		0	0	0	0	0	0	0	0	0	0	14,958

DEPARTMENT OF ENERGY
SAFEGUARDS AND SECURITY ESTIMATES
FY 1995 Col. of FY 1997 Congressional
Operating Expenses - Activity Summaries
(In Thousands)

	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Protect. Forces	Total Physical Protect. Systems	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	Total Research & Develop.	TOTAL OPERATING EXPENSES
-->	PITTSBURGH NAVAL REACTORS (PNR)									
AJ	Naval Reactors	252	6,078	132	7	449	61	981	901	8,861
GH	Security Investigations	0	0	0	0	0	2,230	0	0	2,230
-->	GRAND TOTAL, PNR	252	6,078	132	7	449	2,291	981	901	11,091
-->	SCHENECTADY NAVAL REACTORS (SNR)									
AJ	Naval Reactors	627	5,063	2,849	336	647	558	671	0	10,751
GH	Security Investigations	0	0	0	0	0	668	0	0	668
-->	GRAND TOTAL, SNR	627	5,063	2,849	336	647	1,226	671	0	11,419
-->	HEADQUARTERS									
AD	Fossil Energy Program Direction	110	0	0	0	0	0	0	0	110
GB0506	Emergency Management Division	50	0	75	0	25	0	0	0	150
GD	Nuclear Safeguards & Security	20,468	9,254	682	0	12,238	0	0	0	42,642
GH	Security Investigations	0	0	0	0	0	2,828	0	0	2,828
HS	Security Evaluations	12,000	0	0	0	0	0	0	0	12,000
NB	Emergency Preparedness	25	0	0	0	25	0	0	0	50
NS	Nuclear Safety Oversight	23	0	5	0	12	0	15	0	55
NT	Intelligence	115	0	29	0	288	201	0	0	633
WA-50	General Admin. Program Direction	0	0	0	0	0	0	0	0	0
WM-10	General Admin. Contractual Serv.	19	0	0	0	0	0	0	0	19
	All Other B & R's	71	0	0	0	178	38	0	0	287
-->	GRAND TOTAL, HEADQUARTERS	32,881	9,254	791	0	12,766	3,067	15	0	58,774
-->	GRAND TOTAL, DEPARTMENT OF ENERGY	116,392	303,020	66,923	77,675	48,252	67,550	57,269	35,815	772,896

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DEPARTMENT OF ENERGY
SAFEGUARDS AND SECURITY ESTIMATES
FY 1995 Col. of FY 1997 Congressional
Capital Equipment and Construction - Activity Summaries
(In Thousands)

	SITE/FACILITY/CONTRACTORS	Total Program Direction	Total Physical Security	Total Trans-portation	Total Infor-mation Security	Total Personnel Security	Total Material Control & Account.	TOTAL CAPITAL EQUIPMENT	General Plant Projects	Line Item Constr.	TOTAL CONSTRUC-TION	TOTAL SAFEGUARDS & SECURITY
-->	PITTSBURGH NAVAL REACTORS (PNR)											
AJ	Naval Reactors	0	18	0	0	0	9	27	0	0	0	8,888
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	2,230
-->	GRAND TOTAL, PNR	0	18	0	0	0	9	27	0	0	0	11,118
-->	SCHENECTADY NAVAL REACTORS (SNR)											
AJ	Naval Reactors	0	120	0	0	0	0	120	0	0	0	10,871
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	668
-->	GRAND TOTAL, SNR	0	120	0	0	0	0	120	0	0	0	11,539
-->	HEADQUARTERS											
AD	Fossil Energy Program Direction	0	0	0	0	0	0	0	0	0	0	110
GB0508	Emergency Management Division	0	0	0	0	0	0	0	0	0	0	150
GD	Nuclear Safeguards & Security	880	500	0	140	0	0	1,520	0	0	0	44,162
GH	Security Investigations	0	0	0	0	0	0	0	0	0	0	2,828
HS	Security Evaluations	0	0	0	0	0	0	0	0	0	0	12,000
NB	Emergency Preparedness	0	0	0	0	0	0	0	0	0	0	50
NS	Nuclear Safety Oversight	0	0	0	0	0	0	0	0	0	0	55
NT	Intelligence	0	0	0	0	0	0	0	0	0	0	633
WA-50	General Admin. Program Direction	0	0	0	0	0	0	0	0	0	0	0
WM-10	General Admin. Contractual Serv.	0	0	0	0	0	0	0	0	0	0	19
	All Other B & R's	0	0	0	0	0	0	0	0	0	0	287
-->	GRAND TOTAL, HEADQUARTERS	880	500	0	140	0	0	1,520	0	0	0	60,294
-->	GRAND TOTAL, DEPARTMENT OF ENERGY	1,459	3,816	3,000	299	481	1,195	10,250	743	18,786	19,529	802,675

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NUCLEAR SAFEGUARDS AND SECURITY

Mr. Myers. Explain the $14.8 million and the $9.7 million FY 1996 comparability adjustments.

Ms. Rohlfing. The $14.8 million and $9.7 million comparability adjustments in FY 1996 reflect funding amounts that are now funded in a newly established decision unit for Program Direction rather than in Nuclear Safeguards and Security. I would be happy to provide further information on comparability adjustment in tabular form as an insert for the record. The information follows:

EXPLANATION OF COMPARABILITIES
(In Millions of Dollars)

Operational Support	$14.8
Support Service Contract	7.4
Chicago/Safeguard and Security Division	1.6
New Brunswick Laboratory	4.1
Subscriptions, HW/SW Operation and Maintenance, ADP HW/SW, Telecommunications Equipment and Rental, and Other Services	1.7
Declassification	$ 9.7
Support Service Contract	8.5
Subscriptions, HW/SW Operation and Maintenance, ADP HW/SW, Telecommunications Equipment and Rental, and Other Services	1.2

Mr. Myers. Explain the purpose for the $2.9 million and $2.1 million targeted for Oak Ridge and Richland, respectively.

Ms. Rohlfing. At Oak Ridge, the $2.9 million provides for:

Operational Support ($0.2 million)

- Assistance to DOE Headquarters in the certification/accreditation and evaluation process for Sensitive Compartmented Information Facilities (SCIF) including technical support in the areas of Technical Surveillance Countermeasures (TSCM), Operation Security, Information Security, and Computer Security.

Physical Security ($1.0 million)

- Development and implementation of non-lead ammunition for DOE protective force firearms qualifications and training which will completely eliminate exposure to lead during weapons firing and the placement of lead in the environment. This will result in significant cost reduction in the cleanup/handling of lead waste and contributes to EPA pollution prevention.

- Development of a vehicle portal to externally detect the presence of humans, explosives, contraband, and special nuclear materials hidden in vehicles resulting in increased probability of detection and reducing the time and use of human resources required to perform a physical search.

- Analysis and recommendations on techniques for improving the hardiness, field-readiness, and safety of the Mk 141 Mod 0 Diversional Device to permit its transportation through aqueous environments without affecting its reliability.

- Development of controlled stability shotgun projectiles which will increase the effectiveness of DOE security forces, reduce risk of collateral damage to personnel and sensitive equipment, and reduce the liability to DOE and other Federal users. Additionally, the projectiles are formed using high density metals which are environmentally less toxic than lead.

- Development of body armor (vests) which would provide more comfortable thermal conditions than the current vests which are constructed of fibers coated in plastic that assure safe performance, but become hot and uncomfortable in many situations. This decreases the efficiency of the officer and is a disincentive for the use of the body armor. Improvement in the current vests will help maintain the efficiency of the officers and reduce the number of officer injuries and fatalities because of higher usage of protective armor.

- Development of a less-than-lethal capability utilizing kinetic energy as an alternative to traditional shotguns. This will provide protective force personnel with a less-than-lethal use of force.

Material Control and Accounting ($0.8 million)

- Adaptation of modular storage vaults designed and built for Highly Enriched Uranium to permit its use for plutonium, providing an inexpensive system to provide secure storage for plutonium that can be implemented at many sites due to the flexibility of the individual storage modules.

- Evaluation of the capability of radiation monitors that use optical materials and solid-state sensors to provide continuous measurement of radiation emissions, nuclear signatures, and isotopic profiles. Systems will be identified for these sensors to operate with each other to form a continuous automated vault inventory system or with other sensor systems to meet a variety of nuclear material monitoring needs and can be used in static and active storage areas. This will reduce the cost of completing required inventories and associated measurements, reduce exposure to radiation of individuals, and expand coverage from measuring a statistical sample to 100% monitoring and the real-time monitoring to provide assurance of the integrity of the materials in storage.

- Demonstration of the use of the nuclear weapons identification system to quantify measurements of Special Nuclear Material in a variety of containers. This system will provide more precise measurement capabilities which are difficult to manipulate, providing confirmation of nuclear weapons components and prevent possible diversion or theft of these components.

Information Security ($0.8 million)

- Performance of a comprehensive examination of trusted database management system security technology, including distributed database technology and security. This includes the assessment of DOE and DOE contractor data management needs and practices to determine guidelines for the application of security procedures in data management environments. As a result, this will eliminate the expense of running separate systems and unnecessarily clearing users to high levels, make more efficient use of data by allowing fuller access while protecting it from unauthorized access, and provide savings from nonduplication and elimination of discrete, stand-along systems.

- Design and development of a proof-of-concept Multilevel Secure (MLS) Tested for communication between classified and unclassified personal computer using the same protocol, eliminating the manual passing of information on floppy disks between classified and unclassified computers. This will reduce the number and severity of unauthorized accesses to classified and sensitive information, increase connectivity to facility enhanced communications, and enable staff to more effectively perform their duties in a timely manner.

- Development, maintenance, and update and conduct of Automated Information System (AIS) Security training courses for Classified AIS Security Operations Managers, Classified AIS Security Site Managers, and Independent Verification and Validation Certifiers. This training will help to reduce the numbers and severity of unauthorized access to sensitive and classified information on DOE computer systems.

Facilities Operations - Equipment ($0.1 million)
At Richland, the $2.1 million provides for:

Westinghouse Hanford ($0.3 million)

- Technical support and expertise for the revision, update, and consolidation of Protection Program Operations orders and policies, and development of training and other guidance for field implementation to meet Departmental goals and objectives. This includes the review of physical security system orders, collecting and analyzing complex-wide finding and access control data, and revising tactical training manuals.

- Support to the DOE Headquarters Physical Protection Program Manager resulting from expertise, analytical reviews, and oversight . This includes the certification process of Central Alarm Station Operators, conducting compliance surveys of protective force and maintenance of corrective actions plans, and implementation of the Training Approval Program.

Battelle Memorial Institute ($1.8 million)

- Maintenance of the Information Security Resource Center (ISRC) which defines and develops cost-effective security-related policies to meet the evolving threat to national security and Departmental activities. Through technical expertise, research, analyze, and develop innovative security-related application/implementation techniques for application Department-wide, provide technical assistance on special issues impacting DOE's security program; and serve as the resource center in performing policy and technology assessments, developing complex national security issue requirements and security countermeasures, promoting defense against information warfare initiatives, and ensuring consistency and conformity with national requirements

- Technical assistance for Special Nuclear Material consolidation, Master Safeguards and Security Agreement, Site Safeguards and Security Plan support, vulnerability assessment reviews, performance testing, and in defining uniform measures for the field to determine cost saving approaches to protection program objectives. Provides technical and program support on special issues impacting the DOE's Office of Safeguards and Security, including multi disciplinary teams to address and solve complex national safeguards and security issues. Provides technical expertise in the development of innovative, integrated, and cost-effective national and international security-related policy which supports a sound basis for the protection of classified and sensitive information while facilitating DOE's national security responsibilities and missions, and the openness initiative.

Mr. Myers. For what programmatic purpose is the $12.5 million for Washington-Headquarters intended? Be specific.

Ms. Rohlfing. The $12.5 million for Washington Headquarters is intended for the following activities: $8.5 million for the Headquarters Protective Force, $0.4 million for Safeguards and Security Information Management System (SSIMS), $0.4 million for Alarm System Enhancements/Modifications, $0.1 million for Proforce Radio System/Badging/Access Control $0.9 million for Implementation of Executive Order 12958, $0.7 million for Development of Advanced Automation for the Declassification Productivity Initiative (DPI), $0.7 million for Base Declassification Program (Excludes E.O. 12958) and $0.8 million for Capitalized Equipment for HQ Alarm and Access Control system.

Mr. Myers. Is the full $8.4 million (Albuquerque) for the Central Training Academy?

Ms. Rohlfing. Yes, the $8.4 million is for the Central Training Academy.

Mr. Myers. Object Class 25.2, "Other Services," includes $17.0 million*; provide detail (by element of cost and amount) as to what is included.

Ms. Rohlfing. The $17.0 million breaks out as follows: Central Training Academy - $8.4 million, Headquarters Protective Force contract - $8.5 million, and Miscellaneous - $.1 million.

* Note: The original question erroneously captured $26.9 million for Object Class 25.2. The actual number is $17.0 million.

Mr. Myers. Provide detail on the specifics of the DOE-HQ guard contract in terms of authorized positions, salary/fringe benefits, overtime, other non-labor related elements, etc.

Ms. Rohlfing. This information is provided in a table which I would like to insert for the record. The information follows:

Portrait - Headquarters Protective Force
Contract No. DE-AC01-95SA10165

Security is provided to the Department of Energy Headquarters through a Support Services Contract.

The Protective Force is an unarmed, uniformed force with the mission of preventing unauthorized access, protecting property, protecting and controlling classified and sensitive information, maintaining order, and deterring criminal activity, in and around the DOE Headquarters facilities in the Washington, D.C. and Germantown, Maryland areas.

A. Contractor: Am-Pro Protective Agency, Inc., Headquartered in Columbia, S.C.
General Manager: Clifford J. Edwards

B. Contracting Officer: Michael B. Raizen

C. Contracting Officers Representative: Dale J. Dixon

D. Type Contract: Support Services - Cost Plus Award Fee (CPAF)
Effective Date: May 1, 1995
Length of Contract: Three year base contract with two, one year options

E. Base Contract -3 Years

Estimated Cost	$19,823,806
Base Fee	594,714
Maximum Award Fee	792,953
Total	$21,211,473

Direct Productive Labor Hours: 817,875

F. Option Period - Two, one year options

Estimated Cost	$14,421,483.
Base Fee	432,644.
Maximum Award Fee	576,860.
Total	$15,430,987.

Direct Productive Labor Hours: 545,250 Hours

G. Overtime Policy: Overtime is reimbursed at Overtime rates only if incurred because of emergency/unforseen situations. Maximum Overtime Funds Available: $30,000. Overtime Costs To Date: $18,897.

H. Award Fee:

Award Fee Period #1-Rated: Excellent. Implementation of the contract was delayed due to a protest; consequently, only two of the six months were evaluated.

Percent of Award Fee Earned:	60.06%
Maximum Award Fee Available:	$44,052.94
Award Fee Earned:	$26,458.20
Total Award Fee Earned:	$26,458.20

I. Award Fee Period #2 is being evaluated and end on April 30, 1996. This will be the first complete six month evaluation period.
Maximum Award Fee Available: $132,159.83

J. Manpower is based on the number of security posts, not FTEs

Managerial:	4
Clerical:	2
Trainers:	2
Receptionists:	7
Supervisors:	16
Security Officers:	124
Authorized Manpower Strength:	155
Available Manpower:	145

K. Training:

Basic Training: 120 hours per student; 80 academic hours
40 On-The-Job-Training hours

Annual Refresher Training: 24 annual hours per security officer.

L. Geographical Location: Protective force personnel are assigned to the Forrestal building in the District of Columbia and in the Germantown building, the Cloverleaf and Trevion II buildings located in Germantown.

M. Authority: DOE derives authority to secure it's facilities through Delegation of Authority from the General Services Administration. The Department has Memoranda of Understanding with the Federal Protective Service (FPS) and the Montgomery County Police Department for law enforcement response to DOE facilities. The Forrestal and Germantown buildings are the two primary facilities and are secured 24 hours daily, 365 days per year. The Cloverleaf and Trevion II buildings are secured by special request based on the Oklahoma City bombing, 12 hours daily, Monday through Friday, except Holidays.

N. Security Posts:

Forrestal:	30 security posts, 5 Receptionists 24 hour/7 day per week security presence
Germantown:	14 security posts, 2 Receptionists 24 hour/7 day per week security presence
Trevion II:	2 security posts - 12 hour/5 day per week security presence
Cloverleaf:	2 security posts - 12 hour/5 day per week security presence

O. Salary:

Management range from	$42,078 To $71,364
Supervision range from	$29,307 To $33,633
Trainers	$37,003
Security Officer range from	$25,542 To $26,416
Receptionist range	$21,548 To $22,734
Clerical	$25,979

P. Fringe Benefits are managed and provided to Contractor employees by the Contractor:

Comprehensive Health Insurance
Life Insurance/Accidental Death & Dismemberment Benefits
Vision Care Benefits
Comprehensive Dental Care Benefits
Disability Insurance
Ten Paid Holidays per year
Paid Vacations
Paid Sick Leave
Jury Duty Compensation
Military Leave Compensation
Bereavement Leave
Voting Leave
Relocation Cost Reimbursement for Key Personnel
Performance Recognition Program
Quality Improvement Suggestion Program Bonus
Projected 401K Retirement Program (projected for late 1996)

TECHNOLOGY/SYSTEMS DEVELOPMENT

Mr. Myers. Provide information relative to where (by major Headquarters/field organization) the resources are planned to be allocated.

Ms. Rohlfing. In FY 1997, resources for technology/systems development will be allocated to the following Headquarters and field organizations: $6.4 million for Los Alamos National Laboratory, $7.2 million for Sandia National Laboratory, $0.8 million for Mound, $0.4 million for Brookhaven National Laboratory, $0.2 million for Nevada Operations Office, $2.6 million for Oak Ridge Institute for Science & Education and $3.0 million for Lawrence Livermore National Laboratory.

Mr. Myers. Relative to the request of $16.5 million for Science and Technology Development projects, provide supporting details.

Ms. Rohlfing. The $16.5 million for Science and Technology Development Projects will be allocated for the following purposes:

PHYSICAL SECURITY ($6.5 million)

Develop physical protection technologies and systems for the purpose of preserving national security, protecting key assets, eliminating maintenance costs of old systems and reducing recurring high costs for manpower.

Intrusion Detection and Assessment ($4.1 million)
Develop an improved door sensor to overcome vulnerabilities with balanced magnetic switches which are the most common sensor used throughout the Department. Perform vulnerability testing on multiple sensors installed throughout the Department to identify weaknesses and possible methods of improvement to mitigate insider and outsider threats. Resolve sensitivity problems associated with commercial fiber optic sensors which could potentially produce significant cost savings because of their low installation and procurement costs. Develop a remote operational testing capability for sensors that are employed in extremely hazardous and sensitive environments such as vaults storing nuclear weapons and associated parts and materials. Develop a ubiquitous operational surety system to satisfy Departmental, national security and operational requirements expected to surface in the next ten years. Develop physical security countermeasures to terrorist threats. Complete technology transfer of a scannerless laser radar to private industry so that field sites can use this inexpensive high performance sensor. Develop standards for testing and calibrating CCTV cameras and video motion detection systems so that current labor intensive practices can be phased out. Continue development of an enclosed space detection system capable of detecting adversaries that may be hidden within in large vehicles entering very sensitive facilities. Develop a rapidly deployable security system that will be used as an emergency supplement for failed perimeter intrusion detection zones, to support crisis security situations, and to segregate uncleared personnel from very sensitive assets during facility decommissioning or decontamination activities. Many guards are currently used for these supplemental purposes at a significant cost to the Department. Develop a contraband detection

system using a proven low dose x-ray technology to detect surreptitious removal of special nuclear material. Perform an analysis of how the increasingly likely insider would exploit vulnerabilities of existing protection systems for nuclear materials weapons and materials, and how this realistic insider threat should be countered. Develop security system performance standards to help measure the quality of security systems throughout the complex and provide a consistent minimum requirement. Develop advanced sensor signal processing concepts, human presence detection, frequency stimulus approaches and intelligent alarm analysis to improve the accuracy of security systems through the reduction of false and nuisance alarms. This will translate into cost avoidances through more appropriate console operator actions and reduced numbers of unnecessary security response force dispatches. Develop a cost-benefit analysis system that couples with a risk analysis tool so that field sites can make cost conscious decisions when designing and buying security systems. Evaluate sensitivity of commercial vapor explosives detectors for implementation in the DOE complex to rapidly detect explosives when they are concealed on people or confined within vehicles.

Access Control ($1.3 million)
Explore advanced security concepts such as body biometrics as a means to positively and passively identify individuals. Characterize the performance of biometric authentication devices via controlled laboratory testing so that field sites are able to make intelligent and cost conscious procurement decisions based on product performance. Develop a robotic approach to performing inventories of nuclear materials stored in vaults, all of which currently must be manually inspected at required frequent intervals even when the latest monitoring and tamper indicating technologies are used. Development of enhancements for an access control system that has been adopted as the Departmental standard and is being fielded at several of the most sensitive DOE sites. Continue development of minimally intrusive biometric identification techniques for the rapid identification of personnel entering sensitive facilities.

Access Delay ($0.5 million)
Explore enhanced activated barrier technologies to overcome operational and environmental issues associated with current activated barriers. The enhanced activated barrier serves as an alternative to costly fixed barriers. Redesign the cold smoke generator activated barrier as a replacement for currently installed generators, which upon failure will result in an unacceptable risk to the public and a requirement to deploy large numbers of costly security guards. Develop a less-than lethal capability to deny access to an area or object with minimal security.

Response ($0.6 million)
Complete development of two types of non-lead ammunition for caliber's used by DOE that provide better ammunication performance and less environmental hazards than lead ammunition. Develop a replacement for buckshot and lead shot ammunition to provide reduced cleanup costs and better ammunition performance. Continue the cooperative research and development agreement to develop a thermally controlled protective vest for protective force personnel which can provide comfort in warm climates or periods of physical activity. Expand the MK 141 Mod O diversionary device to aqueous environments. The device will provide exceptional tactical capability to produce a desired visual and audible effect while being safe to handle and as well as be operationally versatile.

MATERIAL CONTROL AND ACCOUNTING ($7.8 million)

The material control and accounting program provides the required capabilities to accurately measure special nuclear materials, account for their quantity and location, provide measures to control and detect access to these materials, and to detect their theft or unauthorized diversion.

The Department's changing mission has created new material control and accountability requirements across the DOE complex. As nuclear weapons facilities cease their production mission and are ultimately decontaminated and decommissioned, a need exists for measurement capabilities and techniques to quantify difficult-to-measure materials and more accurately detect and quantify materials in hold-up. Increased weapons return, dismantlement, and storage activities require specialized measurement and material control capabilities that do not currently exist, excessive employee radiation exposure, secure storage, and insider protection requirements. Technologies and methodologies for international inspections of domestic DOE facilities are needed to provide sufficient information to determine the presence/absence of special nuclear materials, weapons, or specific chemicals without revealing classified or sensitive information, and without compromising facility security.

Measurements ($5.1 million)
Develop measurement capabilities for previously unmeasurable inventories of scrap, waste, and residue materials to enable DOE facilities to significantly reduce physical security and facility operations manpower. This could save sites a minimum of $450k per year in security inspector manpower and operator manpower costs. Investigate the capability of using the combined thermal/epithermal interrogation prototype to accurately assay special nuclear material scrap and waste products in its many shapes and forms. This ability would avoid the expense of disassembling these units and allow for more efficient storage. Complete the development of an instrument that would provide rapid, nondestructive assay of plutonium waste streams and the ability to detect the presence and location of special nuclear material. Current operations rely on expensive manpower to safeguard waste drums, and the proposed measurement capability would save a minimum of $500k at each plutonium facility. Demonstrate the ability of the Monte Carlo technique to accurately reproduce nuclear detector response. This would provide a cost-effective method of generating test spectra for evaluation of analysis software and test design without requiring a variety of measurement standards which cost up to $50k each. Complete the field-deployable gamma-ray spectrometer which will operate for prolonged periods unattended in ambient temperatures. This system will improve safeguards effectiveness and reduce Department-wide expenditures for safeguards and security by reducing inventory frequency, improving the capability for unattended monitoring, and expediting safeguards closure for hard-to-measure SNM transactions. Maintain a high level of capability for isotopic analysis of nuclear materials to support DOE orders, reduce SNM handling thus improving safety and security, and provide vital support to national treaty obligations. Reduce significant diversion and environmental hazards by more accurately measuring bulk containers. This capability would provide reduced costs and risks as facilities transition to environmental restoration and waste management. Complete the development of an integrated, automated, holdup measurement system to reduce routine holdup measurement time and manpower by a factor of 10. Complete the controlled intrusiveness verification technology (CIVET) tool which would permit international inspection of U.S.

material with minimized risk of compromise of sensitive or classified information. Extend the Mound Electrical Calibration Heater (MECH) probe to replace plutonium standards. The MECH probe would eliminate the handling, shipping, and receiving of plutonium and the associated costs Extend calorimetry to higher wattage items, improve the measurement capabilities of calorimetry, and reduce the associated operating time. Provide cost-effective implementation of nondestructive assay technology to meet audit requirements, such as closure on previously unmeasured inventories. Further develop measurement technologies to provide accurate quantitative special nuclear materials inventories to meet the requirements of storage, shipping, and the assurance that special nuclear material has not been stolen or diverted. Analyze different assay instruments to determine their capabilities and weaknesses for detecting contraband fissile material in outgoing packages and waste containers. Complete the design and begin testing an instrument that provides rapid and accurate neutron-based nondestructive assay measurements to meet DOE inventory verification and stockpile monitoring program requirements. A 33% decrease in measurement time for neutron nondestructive assay could save a minimum of $50K annually per site. Develop the capability to quickly assess the availability, quantities, and locations of SNM throughout the DOE complex. Current methods require time-intensive procedures to access this important information. Complete the transfer of the tomographic prototype scanner. This scanner will provide more accurate and cost-effective characterization of bulk containers of scrap, waste, and residues in DOE facilities. Develop an integrated system that will interface the continuous automated vault inventorying system with facility-wide geographic information system to create a comprehensive interface of all items in storage. The integrated system will provide more effective analysis of data which will support the efficient use of limited storage space. Develop and refine chemical analysis methods for special nuclear materials to reduce operating time and the amount of sample required to assay. The present methods cause much radiation exposure to personnel and create significant amounts of solid and liquid radioactive waste. Update measurement software to integrate with material accounting software databases to provide real-time information of material quantities. Provide more accurate and cost-effective characterization of bulk containers of scrap, waste, and residues in DOE facilities through development of neutron-induced gamma-ray signatures. Develop rapid, accurate nondestructive measurement capabilities for plutonium weapons components and bearing materials and residue materials at DOE facilities. This will save each facility approximately $650K per year in operational costs because materials will not have to be chemically assayed and will result in reduced personnel radiation exposure.

Material Accounting ($0.7 million)
Continue implementation and provide maintenance of the standardized local area network materials accounting system (LANMAS). This accounting system is a standardized system used throughout the DOE complex that was originally released in FY 1996. Upgrades to software will be required as well as assisting additional sites with the implementation of this new more efficient system as their systems become obsolete. Enhance the LANMAS to provide integration with measurement instruments to permit real-time accounting of nuclear materials and eliminate operator error. Each site that implements the system saves $4M in software developmental costs.

Material Control ($0.9 million)
This area concentrates on technologies to extend the frequencies of physical inventories through

continuous surveillance of materials and monitoring material attributes. Physical inventories are both costly and increase personnel radiation exposure. Efforts include completing the continuous automated vault inventory system which will provide continuous monitoring of item and material attributes of materials in storage. This system will greatly reduce operational costs because of less frequent physical inventories, reduce personnel radiation exposure, expand the number of items measured from a random sample to 100%, and provide real-time information on the integrity of materials in storage. Develop a modular storage system for plutonium storage. Currently, there is no modular storage capability for plutonium, and this capability could provide an inexpensive solution for long-term storage of plutonium. Install automated surveillance systems in DOE storage vaults to reduce required inventorying activities and personnel radiation exposure.

Demonstrate the use of seals in hard-to-measure applications to reduce personnel operating costs and radiation exposure associated with conducting inventory and surveillance activities.

Integrated Systems ($0.8 million)
An advanced integrated system for monitoring and tracking material and people in designated areas will be developed. This system will help reduce the insider threat, human radiation exposure related to conducting item checks and physical inventories, and provide increased security.

Standards Development ($0.3 million)
Develop standards for calibrating instruments using physics simulation and computer calculations rather than chemical assay. This will reduce facility operating costs, provide more timely nuclear materials accountability and mitigate the mixed waste problems that are inherent in chemical assay. Participate and write American National Standards Institute standards and American Society for Testing and Materials standards to reduce manpower and operating costs at DOE facilities by disseminating standards for NDA technology applications. Develop accurate standards characterization methods for difficult-to-assay new materials produced during the dismantlement of weapon components, providing the ability to calibrate various NDA systems for more accurate accountability measurements of these new materials.

COMPUTER SECURITY ($2.2 million)

Technology ($1.9 million)
Tools and other capabilities required for the management of secure information systems will be developed. The primary activities will focus on automated auditing techniques for intrusion detection, collection and organization of Automated Information System and operating system vulnerability data, and automated network intrusion alarm and response capabilities. Develop an alarm detection, assessment and response system that can be deployed in an electronic network(s) to sense/detect unauthorized activities that are detrimental to the information on the network or the continued operation of network resources and to respond to the unauthorized activities in a manner that stops, isolates or ejects the activity. Develop a repository populated with all of the known computer security vulnerabilities so that incident response teams will have an up-to-date database of information available to use when analyzing break-ins and other activities. Update the information systems security server which contains security related documentation and software for the DOE community as new tools and documents become available. Develop automatic

methods of verifying the version and authenticity of software, operating systems, and related patches and a suite of tools for use by system administrators to assist them in applying security patches to their systems. Often those patches require high levels of sophsication integrating them into operational systems.

Integration and Assurance ($0.3 million)
Continue development of a combination operation and demonstrational multi-level secure network which will enable both classified and unclassified processing on the same network without comprising sensitive information. An analysis of the security effects of computer environments hosting heterogenous, distributed, trusted data management systems will also be performed.

Mr. Myers. Provide by location the number and types of clearances held by DOE employees, contractors and other federal employees in fiscal years 1995 and 1996.

Ms. Rohlfing. This information is shown in tables which I would like to insert for the record. The information follows:

NUMBER OF CLEARANCES FY-95

Albuquerque

	Employees	Contractors	OGAs [1]	Congress	Total
Q [2]	1,275	27,383	184	0	28,842
L [3]	321	4,923	35	0	5,279
Tot	1,596	32,306	219	0	34,121

Oakland

	Employees	Contractors	OGAs	Congress	Total
Q	215	11,119	51	0	11,385
L	33	1,265	0	0	1,298
Tot	248	12,384	51	0	12,683

[1] Other Government Agency (e.g., OMB Staff)

[2] Q clearances permit access to Top Secret, Secret, and Confidential levels of Restricted Data, Formerly Restricted Data, National Security Information, and special nuclear material.

[3] L clearances permit access to Confidential Restricted Data, Secret and Confidential Formerly Restricted Data, Secret, and Confidential National Security Information, and special nuclear material.

Chicago

	Employees	Contractors	OGAs	Congress	Total
Q	206	840	2	0	1,048
L	26	273	0	0	299
Tot	232	1,113	2	0	1,347

Richland

	Employees	Contractors	OGAs	Congress	Total
Q	81	1,434	7	0	1,522
L	144	2,038	9	0	2,191
Tot	225	3,472	16	0	3,713

Idaho

	Employees	Contractors	OGAs	Congress	Total
Q	236	1,585	20	0	1,841
L	186	3,950	5	0	4,141
Tot	422	5,535	25	0	5,982

Ohio

	Employees	Contractors	OGAs	Congress	Total
Q	7	0	0	0	7
L	1	0	0	0	1
Tot	3	0	0	0	8

Oak Ridge

	Employees	Contractors	OGAs	Congress	Total
Q	552	13,180	56	0	13,788
L	291	8,003	21	0	8,315
Tot	843	21,183	77	0	22,103

Pittsburgh

	Employees	Contractors	OGAs	Congress	Total
Q	260	2,978	18	0	3,256
L	1	6,916	5	0	6,922
Tot	261	9,894	23	0	10,178

Rocky Flats

	Employees	Contractors	OGAs	Congress	Total
Q	182	4,264	50	1	4,497
L	32	478	8	0	518
Tot	214	4,742	58	1	5,015

Schenectady

	Employees	Contractors	OGAs	Congress	Total
Q	83	1,320	14	0	1,417
L	0	4,856	25	0	4,881
Tot	83	6,176	39	0	6,298

Savannah River

	Employees	Contractors	OGAs	Congress	Total
Q	252	8,035	76	0	8,363
L	287	9,065	36	0	9,388
Tot	539	17,100	112	0	17,751

Nevada

	Employees	Contractors	OGAs	Congress	Total
Q	387	3,762	34	0	4,183
L	0	81	6	0	87
Tot	387	3,843	40	0	4,270

Headquarters

	Employees	Contractors	OGAs	Congress	Total
Q	3,579	2,508	3,997	229	10,313
L	362	601	165	0	1,128
Tot	3,941	3,109	4,162	229	11,441

NUMBER OF CLEARANCES FY-96

Albuquerque

	Employees	Contractors	OGAs	Congress	Total
Q	1,221	25,712	261	0	27,194
L	303	5,069	52	0	5,424
Tot	1,524	30,781	313	0	32,618

Oakland

	Employees	Contractors	OGAs	Congress	Total
Q	214	10,592	95	0	10,901
L	34	1,501	4	0	1,539
Tot	248	12,093	99	0	12,440

Chicago

	Employees	Contractors	OGAs	Congress	Total
Q	196	823	3	0	1,022
L	29	257	0	0	286
Tot	225	1,080	3	0	1,308

Richland

	Employees	Contractors	OGAs	Congress	Total
Q	92	1,373	7	0	1,472
L	124	1,921	9	0	2,054
Tot	216	3,294	16	0	3,526

Idaho

	Employees	Contractors	OGAs	Congress	Total
Q	207	1,508	20	0	1,735
L	167	3,555	5	0	3,727
Tot	374	5,063	25	0	5,462

Ohio

	Employees	Contractors	OGAs	Congress	Total
Q	7	0	0	0	7
L	1	0	0	0	1
Tot	8	0	0	0	8

Oak Ridge

	Employees	Contractors	OGAs	Congress	Total
Q	471	12,904	54	0	13,429
L	326	7,712	21	0	8,059
Tot	797	20,616	75	0	21,488

Pittsburgh

	Employees	Contractors	OGAs	Congress	Total
Q	615	2,898	19	0	3,532
L	0	6,824	5	0	6,829
Tot	615	9,722	24	0	10,361

Rocky Flats

	Employees	Contractors	OGAs	Congress	Total
Q	191	3,934	43	0	4,168
L	29	556	7	0	592
Tot	220	4,490	50	0	4,760

Schenectady

	Employees	Contractors	OGAs	Congress	Total
Q	83	1,240	14	0	1,337
L	0	4,505	23	0	4,528
Tot	83	5,745	37	0	5,865

Savannah River

	Employees	Contractors	OGAs	Congress	Total
Q	256	7,446	50	2	7,754
L	286	8,940	47	0	9,273
Tot	542	16,387	97	2	17,028

Nevada

	Employees	Contractors	OGAs	Congress	Total
Q	380	3,080	38	0	3,498
L	0	61	7	0	68
Tot	380	3,141	45	0	3,566

Headquarters

	Employees	Contractors	OGAs	Congress	Total
Q	3,142	2,380	3,795	203	9,520
L	346	582	158	0	1,086
Tot	3,488	2,962	3,953	203	10,606

Mr. Myers. The FY 1997 request includes $3.5 million for "Other Services." Explain by element of cost the items/activities included and the associated cost of each.

Ms. Rohlfing. The amount reflected for "Other Services" supports the following activities totaling $3.5 million:

- o Electronic Transfer Program - Full implementation and support of an electronic network among DOE field offices contractors, the Office of Personnel Management (OPM) and other federal agencies to reduce the overall access authorization processing time. The network allows for real-time transmissions of personnel security and clearance information and provides the backbone for a DOE complex-wide door-to-door access control system embodying enhanced automated security technologies. ($1.2 million)

- o DOE Integrated Safeguards & Security System (DISS) Upgrade - Modernization of personnel security databases to be part of the electronic clearance process and to integrate them with the facility and access authorization systems. The upgrade incorporates accelerated data transmission, automated data validation, a baseline for clearance reinvestigations, a common DOE system and data format, and provides real-time reporting and auditing capabilities for trend analysis. ($1.3 million)

- o Accelerated Access Authorization Program (AAAP) - Continue to support the AAAP Testing Center, Albuquerque, New Mexico, to provide a means of accelerating access authorizations for individuals needing Q clearances while avoiding delays which may occur in the security clearance process. ($0.6 million)

- o Personnel Security Support by Oak Ridge Institute of Science and Education (ORISE) - The Center for Human Reliability Studies (CHRS) at ORISE performs personnel security research and analysis activities; and the Training and Management Systems Division (TMSD) develops and distributes security education briefing materials, as required under the Security Awareness Program. ($0.4 million)

Mr. Myers. What is the Department doing to aggressively force headquarters and field managers and contractors to eliminate needless security clearances? Notwithstanding that such efforts have been occurring with some success in the past couple of years, real success appears to be too long in coming. Please elaborate.

Ms. Rohlfing. The number of access authorizations has been reduced from 168,965 at the start of CY 1993 to 128,085 by April 1, 1996. That reduction equals 40,880 access authorizations or nearly a quarter of the original number. The access authorization numbers are totals for all clearances, including Federal employees and other Government agencies, as well as contractors. There will not be a direct correlation between the reduction in contractor employee numbers and the reduction in total access authorization numbers for several reasons. The population, as noted, is not identical (all clearances v. Contractor employment reductions). In addition, it is not known what percentage of the terminated contractor employees were cleared. It is reasonable to assume that the less essential elements of the contractor workforce were the first to be released; many may not have had duties requiring access authorization. There is no percentage relationship between size of workforce and number of clearances. No Government agency approaches the clearance process through a statement that a certain flat percentage of the population shall be cleared. The relationship is between the duties of the individual and the need for access in the performance of those duties. It may well be that when the number of contractors is reduced to the absolute minimum needed to perform essential Departmental missions a larger percentage of the whole will be cleared, although there will be a continuing reduction in the actual number of access authorizations.

Two sites provide examples of access authorization reduction in the Department. At the Hanford site at the start of FY 1993, total employment was 16,096 with 9,192 clearances. As of April 1, 1996, the employment totals were 14, 258 while the clearances numbered 3,413. Employment was reduced by 11% while clearances were reduced by 63%. At the Albuquerque Operations Office, between FY 1994 and FY 1995, the total number of contractor employees was reduced by 524 while the number of Q access authorizations held by contractors was reduced by 510 and the number of L access authorizations held by contractors was reduced by 214. The pattern of reduction varies throughout the DOE complex, depending on the mission needs of specific sites; however, overall the pattern has been one of a very successful reduction effort.

At the time of reinvestigation every access authorization is scrutinized to assure its necessity prior to committing funds for reinvestigation. The Department will continue to strongly pursue this avenue in its reduction effort.

The declassification effort of the Department is not reflected in the statistics cited from FY 1994 and FY 1995. As with the consolidation of materials, this is the beginning of a process and philosophy which should produce benefits when fully realized.

EMERGENCY OPERATIONS

Mr. Myers. Please provide a Department-wide crosscut of emergency response and operations funding by program and account, and associated FTEs for fiscal years 1995, 1996, and 1997.

Ms. Rohlfing. I would like to provide tables for the record which list the funding and associated FTEs for the Department's emergency response and operations programs. The information follows:

DOE Emergency Crosscut
(Dollars in millions)

	FY 95	FY 96	FY 97
Weapons Activities			
Stockpile Management			
Radiological/Nuclear Accident Response			
Nuclear Emergency Search Team (NEST)	33.5	35.8	33.9
Federal Radiological Monitoring and Assessment Center (FRMAC)	1.0	1.0	1.0
Aerial Measurements System (AMS)	10.6	10.6	10.8
Atmospheric Release Advisory Capability (ARAC)	7.4	7.4	7.7
Accident Response Group (ARG)	10.1	10.9	16.3
Radiological Assistance Program (RAP)	2.4	2.4	2.5
Radiation Emergency Assistance Center/Training Site (REAC/TS)	0.9	1.1	1.0
Special Applications	2.9	0.5	2.2
Emergency Management Support	0.3	0.3	0.4
Washington Aerial Measurements Operations Facility Replacement	0.0	0.9	3.8
Other Defense Activities			
Emergency Management	13.2	16.9	16.8
NN Program Direction	12.4	6.4	6.3
Nuclear Energy Research and Development			
Termination Costs, ANL-W/Emergency Preparedness	0.5	0.4	0.4
Advanced Radioisotope Power System/Emergency Preparedness	0.6	0.8	2.2
Oak Ridge Landlord/Emergency Operations Center	1.6	1.5	1.2
Program Direction/Emergency Preparedness	0.3	0.3	0.3
Uranium Programs			
Paducah Gaseous Diffusion Plants/Emergency Preparedness	0.1	0.0	0.0
Portsmouth Gaseous Diffusion Plants/Emergency Preparedness	0.1	0.1	0.1
Bonneville Power Administration	0.3	0.3	0.3
Strategic Petroleum Reserve	243.6	287.0	221.3
Fossil Energy Research and Development	0.4	0.4	0.4
Naval Petroleum Reserves	0.3	0.3	0.3
Defense Environmental Restoration and Waste Management			
Waste Management			
Waste Isolation Pilot Plant/Western Governors Association	0.1	0.7	1.1
Emergency Response Stipulated Agreeement between New Mexico and DOE	0.4	0.7	1.1
Environmental Restoration			
Fernald/Emergency Preparedness	1.3	1.2	1.1
Site Operations			
Emergency Management	3.0	0.0	3.2
Idaho Operations Office			
INEL Emergency Preparedness	2.1	2.1	1.9
INEL Emergency Response Facility Project	5.3	5.2	0.7
INEL Firefighters	3.5	3.9	3.7
Ohio Field Office			
Emergency Operations	0.0	0.0	0.3
Richland Operations Office			
Field Emergency Operations Center and Field Emergency Preparedness	4.7	3.5	3.5
TOTAL, Department of Energy	**362.9**	**402.6**	**345.8**

Funding for FY 1995 and FY 1996 is presented on a comparable basis.

DOE Emergency Crosscut
(Federal FTE's)

	FY 95	FY 96	FY 97
Weapons Activities			
Stockpile Management	26	21	21
Other Defense Activities			
NN Program Direction	67	52	50
Nuclear Energy Research and Development	3	3	3
Bonneville Power Administration	6	6	5
Strategic Petroleum Reserve	154	148	139
Fossil Energy Research and Development	2	2	2
Naval Petroleum Reserves	2	2	2
Defense Environmental Restoration and Waste Management			
Waste Management	1	1	1
Environmental Restoration	18	18	16
Site Operations	110	96	81
TOTAL, Department of Energy	389	349	320

FTE's for FY 1995 and FY 1996 are presented on a comparable basis.

EMERGENCY MANAGEMENT

Mr. Myers. Provide a detailed listing of all activities funded in the emergency management portion of the budget. Include the name of the contractor performing the work, the location of the work, and the funding for each activity.

Ms. Rohlfing. I would be happy to provide a detailed listing of all activities funded in the emergency management portion of the budget for the record. The information follows:

Brookhaven National Laboratory, Upton, NY, $300,000
Technical support to the Subcommittee on Consequence Assessment and Protective Actions. The Subcommittee, chaired by the Office of Emergency Management, consists of Department of Energy (DOE) representatives who meet to address issues, propose, and execute resolutions for the DOE complex regarding consequence assessments and protective actions.
Current issues include Acute Exposure Guide Limits for chemical emergency response; the effect of chemical mixtures on emergency response; and, expansion of the existing Atmospheric Release Advisory Capability's modeling expertise into the hazardous chemicals release arena.

Lawrence Livermore National Laboratory, Livermore, CA, $800,000
$600,000 for Atmospheric Release Advisory Capability (ARAC) to continue enhancements for modeling atmospheric dispersion of nonradioactive hazardous materials and plume modeling.

$200,00 for Communicated Threat Program to identify, assess, and disseminate information on nuclear material trafficking which identifies actual or potential thefts and diversion of nuclear materials world wide. Also to support nuclear awareness/threat training activities.

Idaho National Engineering Laboratory, Idaho Falls, ID, $200,000
Architect and engineering support for completion of the Headquarters Technical Support Center. Funding will also provide support to DOE facilities for development and design of a standardized emergency operation center design and construction handbook. Cost savings can be realized through standardization and use of existing technical resources.

Los Alamos National Laboratory, Los Alamos, NM, $100,000
Funding to improve the Department's capabilities in the electronic display arena, improving information availability within and between emergency operation centers during emergency response, and enabling electronic communications between field response units and emergency operation centers.

Nevada Operations Office, Bechtel Nevada, Las Vegas, NV, $6,500,000
Direct support and maintenance of a Graphic Information System (GIS) which contains map data of the United States, Department of Energy facilities and areas, and other facilities.

HAZMAT Spill Center support, including maintenance, installation, and training activities required for facility operation and conduct of tests. Also includes necessary upgrades.

Aerial photography of DOE facilities to support Headquarters and field response activities.

System support for Headquarters Emergency Operations Center (EOC), prototype for testing and verifying equipment to ensure a fully operational system and provides for enhancements and upgrades. Also supports equipment and database upgrades and expansion to ensure a fully operational system and provides equipment maintenance and support for DOE EOC voice, data, and video network, ensuring continuous operability and capabilities as users are added to network.

Training support for specialized courses for emergency response including new course on Lead Federal Agency Responsibilities and Emergency Management Personnel Orientation for the emergency management community.

Support of threat related assessments of nuclear materials trafficking.

Oak Ridge Operations Office, Oak Ridge, TN, Oak Ridge Institute for Science and Education and Oak Ridge National Laboratory, $1,800,000

Oak Ridge Institute for Science and Education, Oak Ridge, TN, $1,740,000
Funding for the ORISE Technical Expert program which maintains a roster of qualified technical experts in various disciplines such as energy emergencies, hazardous materials, meteorology, health physics, available to support for short-term projects as technical issues arise. Technical experts also support DOE exercise evaluations and the development of emergency management guides. Support is equivalent of approximately 5 FTEs.

Also provides support on training courses for scoping, development and conduct of workshops and courses, including: Exercise Development, Emergency Management Team Training and Training Overview, Appraisal Program Training, Consequence Assessment, Hazards Assessment, Emergency Management in the DOE System, and Computer Based Training for Emergency Management Issues.

Support for outreach programs including Electric Service Priority Program and State Exercise/Seminar Series, which provide information about DOE capabilities and fosters improved coordination for planning, preparedness, and response activities with State, Tribal, and Local governments.

Historic Incidents Database includes information about incidents stemming from DOE research and other pre-operational activities, from DOE military and civilian operations, both nuclear and non-nuclear. This information is reference material which will assist in trends analysis in the event of an emergency.

Support Training Resources and Data Exchange (TRADE) Emergency Management Issues Special Interest Group (EMI SIG), sponsored by Office of Emergency Management, which is a forum to promote effective emergency management practices throughout the DOE complex.

Oak Ridge National Laboratory, Oak Ridge, TN $60,000
Support for development of state energy emergency plans.

Pacific Northwest Laboratory, Richland, WA $200,000
Development of prototype tool for demonstrating Message Stream Analysis based on Spatial Paradigm for Information Retrieval and Exploration (SPIRE) visualization technology enhanced by user interface components specific for message analysis. This system tracks and collates information for trend and threat analysis.

Sandia National Laboratory, Albuquerque, NM, $200,000
Development of Radiological/Chemical Indicator (RCI) sensor for use by first responders to incidents similar to the Tokyo sarin gas attacks or the Oklahoma City or World Trade Center bombings. The RCI will indicate the presence of chemical or radiological contamination to first responders, providing information authorities outside the incident area can act upon for containment and mitigation.

Mr. Myers. How many federal employees work in the emergency management program?

Ms. Rohlfing. The Office of Emergency Management has 52 FTEs working in the emergency management program.

Mr. Myers. How many FTE equivalents are funded through support service contracts in this program?

Ms. Rohlfing. The Office of Emergency Management funds an FTE equivalent of 20 positions through support service contracts. 15 of these positions directly support the Emergency Operations Center 24-hour per day watch office function and are identified in the Program Account. The remaining positions support conduct of: technical assistance appraisals, emergency response tests and exercises, counterterrorism liaison and activities, readiness assurance activities, and assistance in monitoring domestic energy situations. These 5 FTE equivalents are funded in the Emergency Management Program Direction Account.

In addition, the Office of Emergency Management funds a roster of 30 Technical Experts who are used on a case-by-case basis to augment the technical capabilities of the staff for the conduct of evaluations and appraisals. These technical experts are typically employed for periods of five to ten days to support these activities, and would account for no more than five FTEs per year.

Mr. Myers. Why do individual program offices at Headquarters have their own emergency management organizations when there is a central Departmental office for emergency management?

Ms. Rohlfing. The Office of Emergency Management provides overall direction for the Department's Emergency Management system through the promulgation of policy, requirements, implementing guidance and technical standards. The Office of Emergency Management also ensures the readiness of emergency response capabilities of Departmental elements through appraisals of emergency management programs, evaluations of emergency response exercises, and reviews of Emergency Readiness Assurance Plans developed by contractor and Departmental elements.

In addition, the Office of Emergency Management ensures required coordination between all Departmental program elements, other Federal agencies, and international agencies and foreign governments to assure effective and efficient response to emergency and/or potential emergency situations. This Office also ensures communication systems and protocols; and provides independent evaluation and oversight to eliminate inconsistencies and avoid redundancy. In addition, the Office assures integration and compatibility of Departmental emergency management activities to include effective and compatible Emergency Operations Center functions throughout the Department.

Emergency management organizations within individual program offices provide program-specific implementation of requirements, guidance, and technical standards associated with the Emergency Management System. In addition, Defense Programs provides programmatic direction for the Department's seven radiological emergency response assets, which include: Nuclear Emergency Search Team; Accident Response Group; Aerial Measuring System; Atmospheric Release Advisory Capability; Federal Radiological Monitoring and Assessment Center; Radiation Emergency Assistance Center/Training Site; and the Radiological Assistance Program. Environmental Management provides programmatic direction for the radiological transportation emergency preparedness program.

Mr. Myers. Please provide a list of all tests performed or planned at the Liquefied Gaseous Spill Test Facility in fiscal years 1995, 1996, and 1997.

Ms. Rohlfing. I would be happy to provide a list of all tests performed or planned at the HAZMAT Spill Center (formerly the Liquefied Gaseous Fuels Spill Test Facility) in fiscal years 1995, 1996, and 1997 for the record. The information follows:

FY 1995
HAZMAT SPILL CENTER
Tests Conducted

(Formerly the Liquefied Gaseous Fuels Spill Test Facility)

Number of Weeks	Sponsor, Activity
26	Chemical Analysis by Laser Interrogation of Proliferation Effluents (CALIOPE), Remote Sensor Test Range (RSTR)
9	EPA Pan Evaporation Tests
4	Petroleum Environmental Research Forum (PERF) Gas Dispersion Tests
3	DuPont Acid Fuming Workshops
3	US Government Effluent Tracking Experiment (ETE)

FY 1996
HAZMAT SPILL CENTER
Tests Conducted and Planned

Week of:	Sponsor, Activity
October 2	Chemical Analysis by Laser Interrogation of Proliferation Effluents (CALIOPE), Site Restoration
October 9	" " "
October 16	Chemical and Biological Defense Establishment (CBDE), Aerosolisation and Dispersion Simulant Experiment Project
October 23	" " "
October 30	" " "
November 6	" " "
November 13	" " "

December 4	CALIOPE, Wind Tunnel Characterization
December 11	" " " "
February 5	DOD, Navy Thermal Treatment Unit (NTTU) Demilitarization Project
February 15	" " " "
February 26	" " " "
March 4	" " " "
March 11	" " " "
March 18	CALIOPE Site Preparation
March 25	" " "
April 1	" " "
April 8	" " "
April 15	" " "
April 22	" " "

Planned Tests for Remainder of FY 1996

May 6	DuPont, Fuming Acid Workshops
May 13	" " " "
May 20	" " " "
May 27	" " " "
June 3	CALIOPE, Field Tests
June 10	" " "
June 17	" " "
June 24	" " "
July 1	" " "
July 15	" " "
July 22	DOD, Holistic Unmanned Aerial Vehicle/Surface Acoustic Wave Sensor Integration Effort (HUSSIE) II SENSOR Integration
July 29	" " " " "
August 5	" " " " "
August 12	" " " " "
August 19	CBDE Project
August 26	" " " "
September 2	" " " "
September 9	" " " "

FY 1997
HAZMAT SPILL CENTER
Potential Customers

Weeks Needed (estimates)	Sponsor, Activity
~ 6	DEA (BREAKTHROUGH)
~ 6 (Fall)	USAF/GeoDynamics (Titan Tests)
~ 4 (Spring)	CMTCO (HUSSIE X)
~ 5 (Late Summer)	CBDE Project
~ 6 (Late Summer)	Petroleum Environmental Research Forum (PERF) Series II
~26 (Dates requested)	CALIOPE (M-Series)
~ 8 (Uncertain)	US Coast Guard (Oil Pool Burns)
~ 5 (Uncertain)	US Gov't Effluent Tracking Experiment (ETE X)
~12 (SPREAD THROUGHOUT)	DuPont (HAZMAT Training)

Estimated 78 Total Weeks of testing for FY 1997. Tests and training can be conducted simultaneously.

Mr. Myers. Explain the $6.5 million which is targeted for the Nevada Operations Office.

Ms. Rohlfing. The $6.5 million dollars planned for Nevada Operations Office in FY 1997 will provide the following:

- Direct support and maintenance of a Graphic Information System (GIS) which contains map data of the US, Department of Energy (DOE) facilities and areas, and other facilities. The GIS data contains population data and identification of state and local emergency response personnel and assets, as well as information on hospitals and other key facilities necessary for deployment and staging. Additionally, the system can annotate evacuation routes and emergency aid locations and be updated as necessary.

- HAZMAT Spill Center support, including maintenance, installation, and training activities required for facility operation and conduct of tests. Also includes necessary upgrades.

- Aerial photography of DOE facilities to support Headquarters and field response activities.

- System support for Headquarters Emergency Operations Center (EOC) prototype for testing and verification of equipment, enhancements, and upgrades. Also supports equipment and database upgrades and expansion to ensure a fully operational system and provides equipment maintenance support for DOE EOC voice, data, and video network, ensuring continuous operability and capabilities as users are added to network.

- Training support for specialized courses for emergency response including new course on Lead Federal Agency Responsibilities and Emergency Management Personnel Orientation for the emergency management community

- Support of threat related assessments of nuclear materials trafficking.

Mr. Myers. Also explain why the resource needs at Nevada have increased by 65% since FY 1995. Be specific by showing what elements of cost are included and the associated estimates of costs.

Ms. Rohlfing. In FY 1995, the Nevada Operations Office received $3,940,000. In FY 1996, this Office is scheduled to receive $6,500,000. The FY 1997 budget request includes $6,500,000, for this Office. The largest factor for the increase in funding is the Hazardous Materials (HAZMAT) Spill Center (formerly the Liquefied Gaseous Fuels Spill Test Facility). The HAZMAT Spill Center moved from Fossil Energy to Nonproliferation and National Security's Office of Emergency Management in late FY 1994, and no monies were budgeted for the facility in FY 1995. Once included in the budget for FY 1996, the funding for the Nevada Operations Office rose commensurate with the funding for the HAZMAT Spill Center, $1,600,000. The remaining additional funds over FY 1995 funding, $960,000, will fund aerial photography surveys of DOE sites, GIS development, maintenance and updating; enhanced threat assessment activities for nuclear trafficking; equipment and system maintenance and enhancement for expanding the Headquarters Emergency Operations Center and the Department's video, voice, and data network, particularly to extend links to additional Departmental elements and other Federal agencies.

Mr. Myers. Provide tabular information which details the activities and related cost estimates for the Washington-Headquarters level of $6.7 million. Also provide the associated manpower requirement (both Federal employees and support service contractors) for each activity.

Ms. Rohlfing. I would be happy to provide information which details the activities and related cost estimates for the Washington Headquarters level of $6.7 million for the record. The information follows:

$2.1 m	Support Service contract supporting the Headquarters Emergency Operations Center 24-hour-per-day watch office response capability. Manpower: 8 Federal/14 contractor
$1.3 m	Dedicated emergency communications links (Wide Area Networks [WANs])with the 8 Department of Energy (DOE) Operations Offices and 4 National Laboratories (WAN is used by additional offices in NN) with satellite backup system to the 8 Operations Offices. Manpower: .1 Federal/1 contractor
$0.3 m	Human Resources costs for various information/communication support, including news wires and other specialized information activities to include secure cryptographic communications support and costs for cellular phones and pagers and the related special facility. Manpower: .1 Federal/3 contractor (HR support)
$ 1.3 m	Combination of Operating ($300k) and Capital Equipment ($1000K) dollars to ensure emergency equipment, including computer and telecommunications equipment, are upgraded and maintained with state-of-the-art technology. All telecommunications and computer equipment upgrades and enhancements are procured through the Headquarters procurement system. Manpower: .1 Federal/no contractor
$ 0.7 m	Support for various interagency commitments with agencies and organizations such as the Federal Emergency Management Agency, Organization of American States, Central United States Earthquake Consortium, Organization for Economic and Co-operative Development and the Federal Bureau of Investigation for threat assessment activities. This amount also funds commitments in support of activities such as Federal Radiological Emergency Response Plan, various outreach programs to state, tribal and local governments, the Department of Transportation for emergency preparedness for hazardous material transportation, and the EPA for hazardous materials emergency response programs including the National Contingency Plan. Manpower: 1 Federal/1 contractor

$1.0 m	Development of technology programs and software for enhanced emergency operations as well as funding to support departmental exercises involving evaluations by the Office of Emergency Management. Most technology program and software development is done by DOE National Laboratories; and Management and Operating (M&O) contractors in support of emergency programs at their facilities. Funding for exercises is necessary to ensure exercise scope is a true test of the emergency management system to meet overall Departmental objectives. Manpower: 1 Federal/1 contractor

Mr. Myers. In the Facilities Operations line, the Department has requested $1.5 million for capital equipment without any specific requirement or justification. Please justify.

Ms. Rohlfing. The funding request of $1.5 million dollars for capital equipment is for operation and maintenance of the Headquarters Emergency Operations Center and the Department's emergency communications network. In FY 1995, we accomplished the nation-wide link-up of the Department's operations offices and select National Laboratory emergency operation centers with the Headquarters emergency operations center voice, data, and video connection. In addition, the Department of Transportation and Federal Bureau of Investigations(FBI) (Quantico, VA) were linked to the Headquarters data connection. In FY 1996, the FBI link was upgraded to include voice and video connection. FY 1996 planning includes links to Environmental Protection Agency and Defense Nuclear Agency. FY 1997 capital equipment expenditures will include equipment enhancements of the voice, data, and video networks to ensure continued expansion capability allowing connection of additional Departmental elements and Federal agencies. FY 1997 expenditures will ensure that existing equipment is upgraded and maintained with state-of-the-art technology and will enable expansion of existing databases to ensure the Department's capability to respond effectively and efficiently to emergencies affecting Departmental operations and activities or requiring Departmental assistance.

NONPROLIFERATION AND NATIONAL SECURITY

PROGRAM DIRECTION

Mr. Myers. By location, please provide a detailed list of all activities included in the support services portion of the program direction account, including funding for each activity in fiscal years 1995, 1996 and 1997.

Ms. Rohlfing. I will be happy to provide that for the record. The information follows:

NONPROLIFERATION AND NATIONAL SECURITY
Support Services
Detail by Location
(Dollars in Thousands)

	FY 1995	FY 1996	FY 1997
Headquarters:			
Verification R&D.....	1,700	1,950	2,025
Emergency Management.....	3,250	625	600
Arms Control and Nonproliferation.....	7,143	8,215	8,717
Security Affairs			
Safeguards & Security	8,160	7,358	7,182
Declassification/Classification	7,372	8,450	12,500
Intelligence.....	1,729	1,123	1,865
Field:			
Nevada.....	350	525	525
Total Support Services	29,704	28,246	33,414

Support services contracts provide an invaluable resource of highly specialized technical expertise to all facets of the Office of Nonproliferation and National Security (NN). These contracts provide skilled analytical and technical liaison personnel who deal with scientific and technical data related to both national security and nonproliferation objectives in an effective and timely manner. Without these support services contracts NN would not have access to the technical expertise necessary to meeting its critical nonproliferation and national security mission.

The following is a summary of the support services provided:

Verification Research and Development. The contractor provides technical, analytic, and program management support services. These services include: analyses of technical opportunities to support future proliferation detection and treaty verification requirements; review and assessment of technology and program status reports; quick response technical analyses of treaty verification studies; and review and assessment of the current state-of-the-art in the multiple technical disciplines associated with treaty verification and proliferation detection.

Emergency Management. There has been considerable consolidation of, and overall reduction in, support service contracts in the emergency management program to reduce the level from $3.25 million in FY 1995 to a requested level of $600,000 in FY 1997 (and from five contracts to two). The remaining funds support conduct of: Technical assistance appraisals, emergency response tests and exercises, counter terrorism liaison and activities, readiness assurance activities, and assistance in monitoring domestic energy situations.

Arms Control and Nonproliferation. Support services contracts are essential to ensure that NN can meet the objectives of the materials protection, control and accounting programs with the former Soviet Union and other nonproliferation initiatives, such as technical, analytical and administrative support for implementation of the Proliferation Information Network Data Base and inter-agency export control activities, and the conduct of export control system technology transfer activities. As in other parts of NN, there has been care to minimize increases in the use of these vehicles where possible. The FY 1997 request reflects an increase of only $502,000 over FY 1996.

Safeguards and Security. The Safeguards and Security program is key to preventing the loss of any nuclear weapon, theft or diversion of special nuclear materials, and ensuring that no loss of life is directly related to a failure of its protection programs. The support service contract, which provides support to field elements for implementation of cost-saving safeguards and security measures, is critical to providing timely and cost effective technical, analytical, and support expertise essential to a balanced Safeguards and Security program that can deal with technology advancements, and address current issues and problems, as well as a dynamic changing environment such as new activities associated with arms control and nonproliferation, and weapons returns. Key talents available through the support service contract include engineers, statisticians, material accounting and control specialists, technical and physical security professionals, and computer security specialists. The support services contract also provides skills for security operations such as badging, fingerprinting, security briefings, etc at our Headquarters operations. In addition, timely security investigations is dependent on this support service contract which provides psychiatrists, personnel security review examiners, reporting and transcript services, and other personnel security clearance services.

Declassification/Classification Program. The mission of the Office of Declassification (OD) is to identify that information which must continue to be protected because of national security and nuclear nonproliferation objectives while declassifying and publicly releasing that information which poses little national security or nuclear proliferation threat or concern. To accomplish this mission, OD relies upon its support service contractors to provide an extraordinarily broad mix of specific technical skills to perform work in the following areas:

- Document Reviews - **Contractors review virtually all documents for OD.** To review documents for either classification or declassification requires individuals with expertise in a wide variety of technical areas; e.g., isotope separation, environmental safety and health, nuclear weapons design. This expertise is typically obtained through a combination of advanced degrees in the physical science or engineering fields and extensive experience in positions dealing with nuclear materials and weapons. The potential subject areas of the documents needing review include not only every classified program currently being conducted in the DOE, but also every obsolete or canceled classified program that was ever conducted in the DOE or its predecessor agencies going back to the Manhattan Project during World War II.

- Technical Guidance - **Contractors are an integral part of the classification guidance development process.** DOE is the custodian of the Nation's technology for defense uses of nuclear energy, including nuclear weapons and nuclear materials production. To assure that such information is protected from potential adversaries, proliferants, and terrorists, detailed, technical guidance must be developed, issued, and revised in all the areas of nuclear weapon design, development, testing, manufacture, disassembly and reuse; arms control and verification; nonproliferation; intelligence; mutual defense treaties; computer codes; and inertial confinement fusion as well as in the following technology areas: isotope separation, chemical processing, tritium technology, space power, production and military reactors, sensitive technologies, strategic petroleum reserve, safeguards bilateral agreements, security, militarily critical technologies, utility system security, and reimbursable research and development programs. As noted under Document Reviews above, individuals who develop, issue, and revise such guidance must have technical degrees and expertise in a wide variety of technical areas.

- Advanced Automation Technologies - **Contractors have unique technical capabilities to assist in the development of advanced automated systems.** The current document declassification process is labor intensive and technically complex. In order to improve the efficiency and effectiveness of this process, efforts have begun to design a system where a computer rather than a person will do the actual initial review of a document and will tag those portions of the document which are probably classified. However, this effort represents a great technical challenge and is a high risk research and development project. Such work requires individuals who are experienced in state-of-the-art automation technologies and advanced programming techniques which can describe and then reproduce the human thought process.

The launching of Secretary O'Leary's Openness Initiative in December 1993 and the signing of Executive Order 12958 in April 1995 both require the declassification and public release of millions of pages of previously classified documents. Prior to a document being released, OD

Mr. Myers. Why does the staffing profile for the Headquarters organization reflect an increase over FY 1996. Be specific.

Ms. Rohlfing. The staffing profile for Headquarters reflects a net increase of 17 FTEs (336 FTEs to 353 FTEs) from FY 1996 to FY 1997. This net increase consists of an increase of 20 FTEs for Hearings and Appeals staff now being funded within our budget and a decrease of 3 FTEs for work related to Nonproliferation and National Security program direction activities at Headquarters.

PROGRAM DIRECTION

Mr. Myers. Provide the same type of information for the other expenses account.

Ms. Rohlfing. I would be happy to provide for the record the detailed information requested on the other expenses account. The information follows:

Nonproliferation and National Security
Other Related Expenses
(Dollars in Thousands)

	FY 1995	FY 1996	FY 1997
Headquarters:			
Verification R&D	1,454	1,474	1,681
Emergency Management	1,057	275	413
Arms Control	275	1,069	1,355
Safeguards and Security	1,902	2,229	2,577
Declassification/Classification	570	829	1,946
Intelligence	2,010	2,337	2,504
Program Direction	5,256	5,324	5,669
Field:			
New Brunswick Laboratory	2,061	2,061	1,489
Chicago - Safeguards & Security	178	45	45
Nevada	11	3	4
Total	14,774	15,646	17,683

The above costs include activities of the Working Capital Fund accounts such as General Services Administration rental (including communications, utilities, and miscellaneous), printing and graphics, copying, supplies, telephones, Defense Contract Audit Agency audits, contract close out, worker's compensation, Senior Executive Service bonuses, office automation (including establishment of a Local Area Network within the Office of Nonproliferation and National Security), operation and maintenance of equipment, small equipment purchases, and other minor miscellaneous activities.

PROGRAM DIRECTION

Mr. Myers. Does the level of FTE's at Chicago represent the NBL staff only or are Chicago operations office federal employees included?

Ms. Rohlfing. The Chicago FTE number includes 42 New Brunswick Laboratory employees and 20 Chicago Operations Office - Office of Safeguards and Security employees who manage and direct the on-site safeguards and security program.

Mr. Myers. The headquarters average FTE for salaries/fringes cost is almost $107,000 which represents one of the highest averages in the Department. Provide detailed information which justifies this average FTE cost.

Ms. Rohlfing. There are three primary reasons for this average. First the average is distorted because the salaries and benefits line includes funding for six other agency detailees that are supported by the Intelligence program, but which are not included in the FTE's shown in the budget. Second, approximately half of the organization's staff was formed by bringing together very senior career employees from Defense Programs to undertake the crucial role that the Office of Nonproliferation and National carries out for international and national level objectives, thus there are many high salaried individuals in the program. Third, the remaining 50% of the staff have an added funding burden because they are under the Federal Employees Retirement System (FERS), which can require Government benefits contributions to be covered for up to 28%, depending on the employees' contributions.

The Nonproliferation and National Security program consists of senior technical experts and analysts who are required to: 1) solve intradepartmental, interagency, and international program and operational problems and issues; 2) represent the Department at senior level interagency and international policy and working groups; and 3) provide program management. The following examples illustrate the types of technical and operational (vs. policy and management) functions that are performed:

The Office of Arms Control and Nonproliferation provides direct support on U.S. arms control and nonproliferation policy in the following areas:

- **Materials Protection, Control &Accounting (MPC&A)**
  Staff provides direct technical support and policy direction on the ground in Russia and the Newly Independent States assessing facilities for specific MPC&A improvements.
- **Comprehensive Test Ban Treaty (CTBT)**
  Staff provides real time technical expertise and support to U.S. treaty negotiations in both the United States and Geneva in the way of timely analysis of U.S. positions and foreign proposals.
- **Democratic Peoples Republic of Korea (DPRK)**
  Staff provides real time technical support to the spent fuel canning operation in North Korea.
- **International Atomic Energy Agency (IAEA)**
  Staff provides direct technical support and policy direction on IAEA safeguards.

The Office of Energy Intelligence Staff is devoted to providing direct intelligence support to policy officials at the DOE and other policy agencies, as well as representing DOE within the Intelligence Community (IC).

- Staff provides frequent - often daily - support to numerous DOE policy officials in the form of: 1) regular meetings to provide intelligence updates, analysis, and background information for meetings with foreign officials in the U.S. or overseas; 2) tasking other parts of the IC to stimulate collection on topics of interest to DOE and arranging for briefings on relevant work underway in other parts of the community; and 3) producing analyses on current intelligence issues of interest to DOE.

- Staff actively contributes to IC activities and plays the lead role in the IC in nuclear intelligence analysis including nuclear weapons and proliferation.
- Staff often leads joint IC assessments, defines collection strategies and is a lead contributor to IC wide collection and analysis on global energy and science and technology issues.

The Office of Emergency Management staffs the Department's Headquarters Operation Center 24 hours per day, seven days per week to ensure notification of nuclear, nonproliferation, and energy incidents and/or emergencies.

- The Office of Emergency Management provides trained technical staff upon declaration of an emergency within the DOE complex as well as technical experts and assistance to other Federal agencies, such as the Federal Emergency Management Agency (FEMA), in support of emergencies resulting from natural disasters and other technological emergencies.
- When not supporting emergency activities, the trained technical staff is responsible for reviewing field office emergency plans to ensure compliance with Departmental policy and for conducting emergency management appraisals and evaluations to ensure an effective and efficient Departmental emergency management system.

The Office of Security Affairs Headquarters has a mixture of operational policy and management functions:

- The Office of Safeguards and Security is responsible for the physical protection of the Washington area Headquarters facilities; processing of security clearances for Headquarters personnel, Congress, etc; and assistance to field offices and contractors on problems and issues related to safeguards and security.
- The Office of Declassification is responsible for policies and procedures for the Government-wide program to classify and declassify nuclear-related Restricted Data, including the promulgation of Federal regulations and detailed technical classification guidance. It also administers all Departmental classification and declassification document review programs, including the systematic review program mandated by Executive Order 12958. Finally, it processes all Freedom of Information Act and other requests involving classified information.

Mr. Myers. Why does the staffing profile for the Headquarters organization reflect an increase over FY 1996. Be specific.

Ms. Rohlfing. The staffing profile for Headquarters reflects a net increase of 17 FTEs (336 FTEs to 353 FTEs) from FY 1996 to FY 1997. This net increase consists of an increase of 20 FTEs for Hearings and Appeals staff now being funded within our budget and a decrease of 3 FTEs for work related to Nonproliferation and National Security program direction activities at Headquarters.

FY 1997 FUNDING FROM OTHER AGENCIES

Mr. Myers. The committee was informed last year that AID would no longer fund these activities, and that was the basis for the funding request by the Department of Energy. Now we see that in addition to the $30 million appropriated to the Department of Energy, AID provided $15.4 million late in FY 1995 and an additional $15.4 million is anticipated in FY 1996. How much will AID or any other federal agency be providing for these programs in FY 1997?

Dr. Lash. The $15.4 million provided in FY 1995 was from AID's FY 1994 appropriation and was given to the Department to fulfill a FY 1994 commitment. The $15.4 million in FY 1996 will also be provided to make up for previous year commitments which AID had made to the program and to fulfill a FY 1996 Congressional mandate to install Safety Parameter Display Systems. No funds are expected from other agencies in FY 1997 for the Soviet-designed Reactor Safety Program or the International Nuclear Safety Centers. The Department could receive some additional funds in FY 1997 to supplement the Department's nuclear safety activities at the Chornobyl nuclear power plant in Ukraine. The specific funding amounts that the Department could receive have not yet been determined.

SOVIET-DESIGNED REACTOR PROGRAM, INTERNATIONAL NUCLEAR SAFETY CENTERS, AND THE CHORNOBYL SHUTDOWN INITIATIVE

Mr. Myers. Please identify all funding the International Nuclear Safety Center at Argonne National Laboratory has received since it was established. Identify the source of the funds and describe the activities performed.

Dr. Lash. This activity was initiated in Fiscal Year 1995, with the U.S. International Nuclear Safety Center formally established at the beginning of Fiscal Year 1996. In Fiscal Year 1995, $5 million under Nuclear Technology Research and Development was used to fund participation of the Center in domestic and international nuclear safety research.

In FY 1996, the U.S. International Nuclear Safety Center is funded at $2.1 million under International Nuclear Safety. Its activities include research and development on accident management technology, systems diagnostics and monitoring, and advanced simulation. It is also developing an international nuclear safety data base that has been exhibited at the January 1996 Gore-Chernomyrdin Commission Meetings and will be exhibited during the April 1996 Nuclear Safety Summit in Moscow. Internationally, the Center is collaborating on nuclear safety and materials properties data bases and advanced computer simulation with the Russian International Nuclear Safety Center.

SOVIET-DESIGNED REACTOR PROGRAM, INTERNATIONAL NUCLAR SAFETY CENTERS, AND THE CHORNOBYL SHUTDOWN INITIATIVE

Mr. Myers. Why is funding shifting between the Energy Supply and Research and Development account and Other Defense Activities?

Dr. Lash. The International Safety Center at Argonne National Laboratory serves dual goals of promoting national security and ensuring the nuclear energy option by striving to make the operation of domestic and foreign reactors safer and more efficient. Given this interdependence, there is no clear-cut "right" account to budget for this work. The Department strongly supports the funding of this important effort, but does not have a preference about where in the Department it is funded. Our rationale for requesting funds for the International Safety Center at Argonne in the Energy Supply R&D appropriation is primarily driven by the tradition of Argonne's funding coming mostly from civilian accounts.

SOVIET-DESIGNED REACTOR PROGRAM, INTERNATIONAL NUCLEAR SAFETY CENTERS, AND THE CHORNOBYL SHUTDOWN INITIATIVE

Mr. Myers. What other International Nuclear Safety Centers exist and where are they located? Describe their activities, including funding.

Dr. Lash. The International Nuclear Safety Center at Argonne National Laboratory is the only U.S. Center. Russia and Ukraine have agreed to establish affiliated centers. Final organization of the Russian Center is not complete, but it is under the auspices of the Russian Federation Ministry of Atomic Energy. We are funding approximately $300,000 in collaborative projects to support this center and its affiliated organizations. Ukraine is establishing an International Research Center on Nuclear Safety, Radioactive Waste, and Radioecology in Slavutich, near Chornobyl. The United States has committed $3 million over two years to this project. We are encouraging other countries to set up similar organizations as vehicles for collaboration that can avoid duplicative work and leverage research and development dollars through joint funding.

In Fiscal Year 1996, the U.S. Center is conducting research and development on accident management technology, systems diagnostics and monitoring, and advanced simulation. It is also developing an international nuclear safety data base that has been demonstrated at the January 1996 Gore-Chernomyrdin Commission Meetings and will be demonstrated during the April 1996 Nuclear Safety Summit in Moscow. In January 1996, the U.S. Center initiated projects on nuclear safety and materials properties data bases and advanced computer simulation with the Russian International Nuclear Safety Center.

Fiscal Year 1996 funding of the U.S. Center is under International Nuclear Safety and amounts to $2.1 million. Of this, $1.6 million is for nuclear research and development conducted by the Center. The Center is using the remaining $500,000 to fund work on collaborative projects by foreign nuclear safety centers and their affiliated organizations in countries where such "seed money" is necessary. The $300,000 noted above for collaboration with Russia comes out of this $500,000. Collaborating foreign organizations typically contribute their own funding and resources in addition to what they receive from the U.S. Center.

In Fiscal Year 1997, the Department has requested funding for activities associated with the U.S. International Nuclear Safety Center in two different places: $5 million under Nuclear Technology Research and Development and $3 million under International Nuclear Safety. The $5 million requested under Nuclear Technology Research and Development is for nuclear safety research and development conducted by the U.S. Center itself. The $3 million requested under International Nuclear Safety is for collaborative work to be conducted by foreign International Nuclear Safety Centers or similar nuclear research and development institutions in the countries of the former Soviet Union, including Russia and Ukraine.

SOVIET-DESIGNED REACTOR PROGRAM. INTERNATIONAL NUCLEAR SAFETY CENTERS, AND THE CHORNOBYL SHUTDOWN INITIATIVE

Mr. Myers. Why aren't all International Nuclear Safety Center activities funded in the same account?

Dr. Lash. Fiscal Year 1997 Nuclear Safety Center activity funding requests are shown in both Nuclear Technology Research and Development and International Nuclear Safety to distinguish research and development activities of the U.S. Center from U.S.-supported collaborative activities of centers or comparable nuclear safety organizations in the Former Soviet Union.

FY 1995, 1996, AND 1997 FUNDING

Mr. Myers. For the Soviet-designed reactor program, the Chornobyl shutdown initiative, and the International Nuclear Safety Centers, provide a list showing all funding from the United States by agency, and funding provided by other countries for fiscal years 1995, 1996 and 1997.

Dr. Lash. Funding provided by United States agencies is shown in a table that I would like to insert in the record. No funding is provided by other countries to the Department of Energy for these projects. The beneficiary countries provide material, labor, and facility contributions for these cooperative projects.

International Nuclear Safety Program
FY 1995, 1996, and 1997 Funding (thousands of dollars)

Funding Source	Fiscal Year	Soviet Designed Reactor Program	Chornobyl Shutdown Initiative	Nuclear Safety Centers[1]	Total Funds Received	Total Funds Expected
AID	1995	57,100	5,900	1,000	64,000[2]	
DOE	1996	22,900	5,000	2,100	30,000	
AID	1996	11,200	6,900		2,700[3]	15,400
DOE	1997	54,200	9,000	3,000		66,200
AID	1997		See Note[4]			See Note[4]
Total		145,400	26,800	6,100	96,700	81,600

(1) Does not include FY 1995 and 1997 funds to ANL from the Nuclear Technology R&D Program.

(2) Includes $45 million appropriated to AID in FY 1994 and transferred to DOE in FY 1995 and $3.6 million in reimbursable funding from AID.

(3) Reimbursable funds from AID.

(4) The specific funding amounts that the Department will receive from AID for the Chornobyl shutdown initiative have not yet been determined.

FY 1995, 1996, AND 1997 FUNDING

Mr. Myers. Of the U.S. funding for each of these initiatives, how much actually went to Russia or other Newly Independent States, and how much was spent in the United States?

Dr. Lash. Of the estimated $178.3 million that the Department will receive for these initiatives in FY 1995, 1996, and 1997, we estimate that $21.4 million (12%) will be spent within the host countries for local materials, labor, and engineering work. The remaining $156.9 million (88%) will be spent in the United States of which an estimated $141 million will be spent on the products and services (equipment, design, engineering, safety analysis, training) for use in the recipient countries.

FY 1995, 1996, AND 1997 FUNDING FOR PROGRAM MANAGEMENT

Mr. Myers. Provide a detailed list and description of all program management costs in fiscal years 1995, 1996, and 1997 including the name of the contractor performing the service.

Dr. Lash. Program management activities are implemented by a national laboratory team that is led by the Pacific Northwest National Laboratory and includes the Brookhaven National Laboratory and the Argonne National Laboratory. Program management activities include the development and performance monitoring of the detailed work scopes and contracts required to implement the specific projects, communications support, travel logistics, performance schedules, project reporting, and cost and administrative controls. The estimated total cost for program management activities against the $129,700,000 expected in FY 1995, 1996 and 1997 is $11,800,000.

RUSSIAN REPLACEMENT POWER PROGRAM

Mr. Myers. Congress did not provide funding for this program in FY 1996, but the Department has carried out a program at a funding level of $5.2 million. Please identify the sources of funding for the FY 1996 program.

Dr. Lash. Sources of funding for the program are: $3 million in FY 1995 from Department of Energy accounts ($1 million from Nonproliferation and National Security and $2 million from Nuclear Energy, $1 million of which was reprogrammed from excess Energy Supply R&D prior year balances) and $1.2 million in FY 1996 from U.S. Department of State's Nonproliferation and Disarmament funds. The remaining FY 1996 funding requirements for the nuclear replacement options study and the production reactor core conversion study are being sought from sources outside the Department of Energy. These studies are intended to examine the feasibility of (1) replacing the current production reactors with commercial thermal and electricity power reactors, and (2) implementing a new fuel design that would prevent the production reactors from producing additional weapons-grade plutonium.

RUSSIAN REPLACEMENT POWER PROGRAM

Mr. Myers. The language in both the House and Senate reports was very clear--no funding was provided for this activity. Why was Congress not informed of the decision to carry out this program in FY 1996?

Dr. Lash. The Senate Committee on Appropriations, Senate Report 104-120, states that the replacement power initiative "would be more appropriately funded under a foreign assistance or national security program." In its capacity as the U.S. implementing agency for the Gore-Chernomyrdin agreement, the Department obtained funding for this effort from its own national security appropriations and the State Department's foreign assistance appropriations, with the remainder being taken from the Department's Nuclear Energy Policy and Management international cooperation fund, a portion of which was internally reprogrammed from excess Energy Supply R&D prior year balances. As the Department followed the Senate's guidance with respect to funding the effort, no additional notice was considered necessary.

RUSSIAN REPLACEMENT POWER PROGRAM

Mr. Myers. Provide all documentation relating to the decision to fund this activity despite Congressional guidance that it not be funded.

Dr. Lash. The attached agreements and congressional language references provide the basis for the decision to fund the Core Conversion and Nuclear Replacement Options Studies of the Nuclear Security/Russian Production Reactor Shutdown Program formerly referred to as the Russian Replacement Power Program. The attachments are summarized below:

- On June 23, 1994, Vice President Gore and Prime Minister Chernomyrdin signed an agreement wherein Russia agreed to cease production reactor operations no later than 2000 under the condition that both countries agree to adopt steps that would provide for replacement sources of thermal and electrical energy by 2000.

- On June 30, 1995, Secretary O'Leary and Minister Viktor Mikhailov signed a bilateral agreement that committed the United States and Russia to an approach which included: (1) feasibility studies on fossil replacement power, (2) the first phase of feasibility studies on nuclear replacement options, and (3) the first phase of a feasibility study on core conversion of the production reactors. In each case there is to be financial and technical participation by the U.S.

- On August 10, 1995, as a direct result of the June 30, 1995, O'Leary and Mikhailov agreement, Dr. Terry R. Lash signed a record of the meeting with Lev D. Ryabev, of the Ministry of the Russian Federation for Atomic Energy, that committed both countries to a work scope and schedule for: (1) completion of the first phase of the nuclear options replacement power study for the three production reactors at Seversk and Zheleznogorsk, and (2) the first phase of the feasibility study on core conversion of these reactors.

- "Our plan was to conduct feasibility studies in FY 1995 to support core conversion options. Feasibility studies of this type are a normal part of making programmatic decisions. The $2 million on Nuclear Energy Policy & Management funds, coupled with the $1 million of Nonproliferation and National Security funds, permitted these activities to be performed in accordance with the above agreements. The FY 1996 budget request briefly described our FY 1995 plans as a part of our request for a formal program to continue the next phase of the effort. The activities conducted in FY 1995 did not commit us to spending additional funds in FY 1996. Thus, we were still able to comply with Congressional direction to seek national security or foreign assistance funding for the next phase. It was not our design to violate the intentions of your committee and we apologize if our FY 1995 plans were not clear to you."

AGREEMENT BETWEEN THE GOVERNMENT OF THE UNITED STATES OF AMERICA AND THE GOVERNMENT OF THE RUSSIAN FEDERATION CONCERNING THE SHUTDOWN OF PLUTONIUM PRODUCTION REACTORS AND THE CESSATION OF USE OF NEWLY PRODUCED PLUTONIUM FOR NUCLEAR WEAPONS

The Government of the United States of America and the Government of the Russian Federation, hereinafter referred to as the Parties,

Affirming the commitment to nuclear disarmament and to the irreversibility and transparency of nuclear arms reduction as articulated by the President of the United States of America and the President of the Russian Federation on January 14, 1994;

Expressing their desire to cooperate with each other to elaborate measures designed to prevent the accumulation of excessive stocks of plutonium and to reduce them in the future;

Noting that an important contribution to a nuclear weapons nonproliferation regime would be made by a verifiable cessation of production of fissile materials for nuclear weapons and by the most rapid conclusion of an international convention to this effect with the widest possible participation of states and on a non-discriminatory basis;

Have agreed as follows:

Article I

1. All reactors listed in the Annex to this Agreement, which is an integral part of this Agreement, shall permanently cease operations no later than the year 2000. Those reactors in the Annex to this Agreement that have already ceased operations prior to entry into force of this Agreement shall not resume operation.

2. In order to facilitate the cessation of the operation of the reactors identified in the Annex to this Agreement as soon as possible, the Parties undertake to adopt agreed steps proceeding from the understanding that replacement sources of thermal and electric energy should be developed on the same schedule as specified in paragraph 1 of this Article.

Article II

1. The plutonium produced after entry into force of this Agreement in the reactors identified in the Annex to this Agreement shall not be used in nuclear weapons.

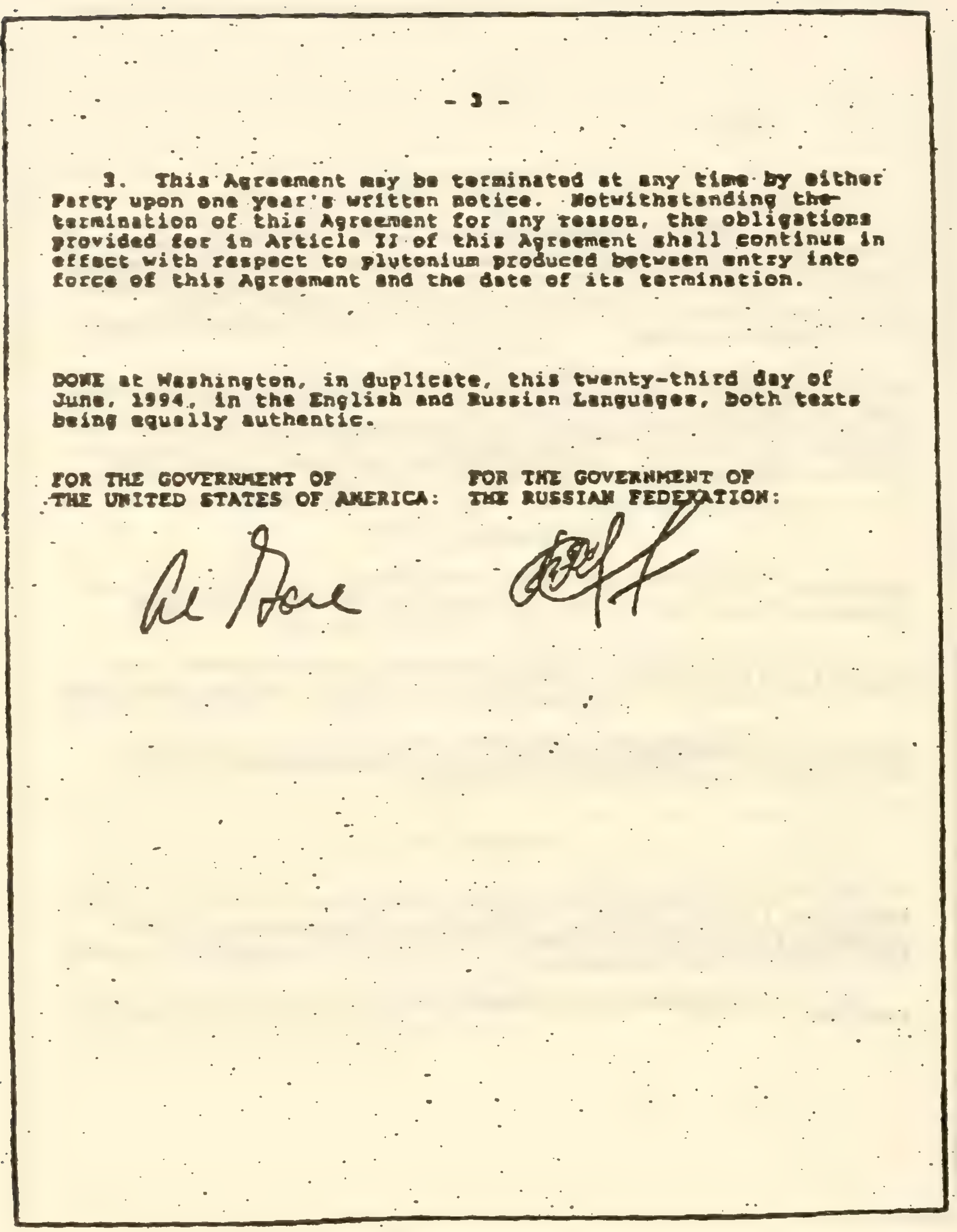
2. Within six months of signing of this Agreement, the Parties shall develop procedures necessary to assure compliance with the obligation provided for in paragraph 1 of this Article.

3. The Parties will strive to reach agreement on the earliest possible total cessation of the production of plutonium for use in nuclear weapons.

Article III

1. This Agreement shall enter into force as of the date on which the Parties exchange diplomatic notes regarding their implementation of the appropriate procedures required for entry into force of the Agreement.

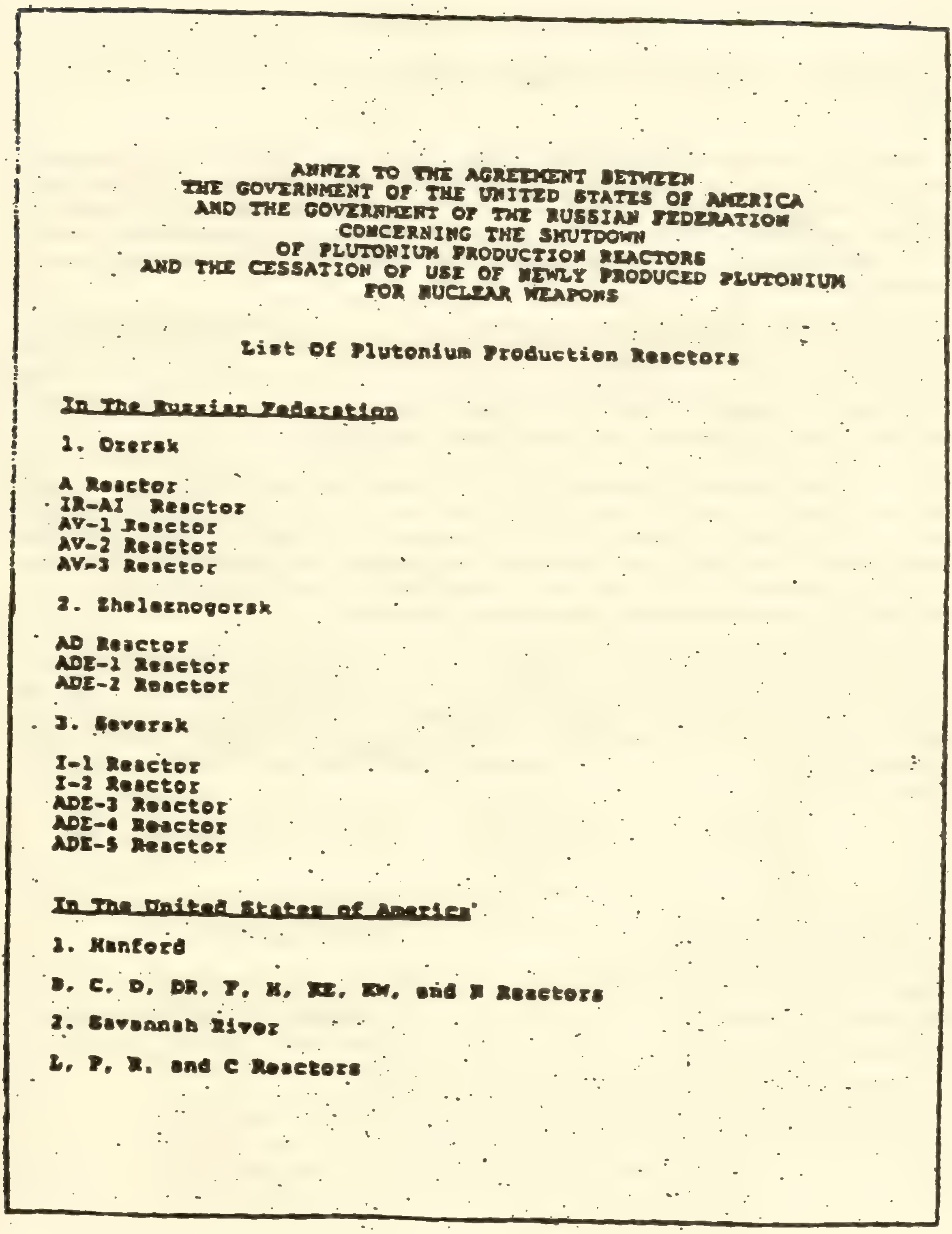
2. This Agreement may be modified by agreement between the Parties.



3. This Agreement may be terminated at any time by either Party upon one year's written notice. Notwithstanding the termination of this Agreement for any reason, the obligations provided for in Article II of this Agreement shall continue in effect with respect to plutonium produced between entry into force of this Agreement and the date of its termination.

DONE at Washington, in duplicate, this twenty-third day of June, 1994, in the English and Russian Languages, both texts being equally authentic.

FOR THE GOVERNMENT OF THE UNITED STATES OF AMERICA:	FOR THE GOVERNMENT OF THE RUSSIAN FEDERATION:
Al Gore	



ANNEX TO THE AGREEMENT BETWEEN THE GOVERNMENT OF THE UNITED STATES OF AMERICA AND THE GOVERNMENT OF THE RUSSIAN FEDERATION CONCERNING THE SHUTDOWN OF PLUTONIUM PRODUCTION REACTORS AND THE CESSATION OF USE OF NEWLY PRODUCED PLUTONIUM FOR NUCLEAR WEAPONS

List Of Plutonium Production Reactors

In The Russian Federation

1. Ozersk

A Reactor
IR-AI Reactor
AV-1 Reactor
AV-2 Reactor
AV-3 Reactor

2. Zheleznogorsk

AD Reactor
ADE-1 Reactor
ADE-2 Reactor

3. Seversk

I-1 Reactor
I-2 Reactor
ADE-3 Reactor
ADE-4 Reactor
ADE-5 Reactor

In The United States of America

1. Hanford

B, C, D, DR, F, H, KE, KW, and N Reactors

2. Savannah River

L, P, R, and C Reactors

STATEMENT OF INTENT

June 30, 1995

In pursuit of their mutual commitment to ensure cessation of production of weapons-grade plutonium, and their overall nonproliferation objectives, the sides state their intent to implement a comprehensive approach to identifying replacement sources of thermal and electric energy currently supplied by the plutonium production reactors at Seversk (Tomsk-7) and Zheleznogorsk (Krasnoyarsk-26). This approach would include:

feasibility studies on fossil replacement power being conducted with the financial and technical participation of the U.S. side,

the first phase of feasibility studies on nuclear replacement options to be conducted with the financial and technical participation of the U.S. side,

the first phase of a feasibility study on core conversion of the production reactors (conceptual design phase) to be conducted with the financial and technical participation of the U.S. side. In order to conduct this feasibility study, the sides would ensure reciprocal access for technical specialists to operating and shutdown production reactors and to all relevant documentation, in accordance with the laws of the Russian Federation and the United States of America.

Decisions to proceed further on a bilateral basis in any of the abovementioned areas would be made based on evaluation by the sides of mutually agreed criteria on nuclear safety, environmental protection, economic factors, timing, and regulatory review and approval by the appropriate Russian regulatory authorities, including the Russian Federal Radiation Protection and Nuclear Safety Authority (Gosatomnadzor).

Hazel R. O'Leary
United States Secretary of Energy

Viktor Mikhailov
Minister of Russian Federation for Atomic Energy

RECORD OF THE MEETING

Core Conversion and Nuclear Options Replacement Power Study Discussions

Moscow, Russia

August 7 - 10, 1995

In accordance with the June 30, 1995, Statement of Intent between Minister of Atomic Energy of the Russian Federation Viktor Mikhailov and the United States Secretary of Energy Hazel R. O'Leary, the Russian and U.S. delegations met in Moscow, Russia from August 7-10, 1995. The purpose of the meeting was to prepare an agreed work scope and schedule for completion of the first phase of the nuclear options replacement power study for the three operating plutonium production reactors at Seversk and Zheleznogorsk and to reach a common understanding on the work scope and schedule of the first phase of the feasibility study on core conversion of these reactors.

As a result of the meeting, the following was achieved:

(1) Joint draft U.S./Russian definitions of tasks and schedules for deliverables for the nuclear options replacement power study and the core conversion feasibility study for Seversk (Tomsk-7) and Zheleznogorsk (Krasnoyarsk-26) were developed and initialed by the two sides. Both sides also agreed that the first phase of the nuclear options replacement power study and the first phase of the core conversion feasibility study shall be completed by December 1, 1995.

(2) Both sides agreed that a visit of U.S. technical experts to Russian facilities at Seversk and Zheleznogorsk would take place in late September and early October.

- o U.S. technical experts will visit both operating plutonium production reactors at Seversk from September 26-29, 1995.
- o U.S. technical experts will visit the operating plutonium production reactor at Zheleznogorsk from October 1-4, 1995.
- o U.S. technical experts involved in the nuclear options replacement power study expect to visit, between September 11-22, 1995, possible sites for construction of replacement nuclear power sources at Seversk and Zheleznogorsk, as well as the design organizations NIKIET, VKBM, VKB GP, NN AEP, VNIPIET, SP AEP in Moscow, Nizhny Novgorod, St. Petersburg, Podolsk and the VK-50 reactor in Dmitrovgrad.

(3) Both sides agreed that a visit of Russian technical experts to the Savannah River Site will take place from December 4-8, 1995. Earlier, U.S. technical experts visited the shutdown reactors at Seversk and Russian technical experts visited the shutdown reactors at Hanford.

(4) The U.S. side provided the Russian side with a list of technical experts who will visit the operating Russian plutonium production reactors at Seversk and Zhelezhogorsk. The sides also agreed that they will consider, during phase one of the core conversion feasibility study, mutual visits to appropriate fuel fabrication facilities which are a necessary part of this study.

(5) Both sides agreed that, in accordance with the June 30, 1995 Statement of Intent, the Russian Federal Radiation Protection and Nuclear Safety Authority (Gosatomnadzor) shall be kept fully informed about both the nuclear options replacement power study and the core conversion feasibility study.

(6) The U.S. side provided the Russian side with four formerly classified documents relating to the U.S. plutonium production reactors at the Hanford plant, in Richland, Washington. The U.S. side also provided the Russian side with a list of additional technical documents that can be made available to the Russian side regarding U.S. plutonium production reactors.

(7) The Russian side provided the U.S. side with a list of equipment that will be needed to carry out this work. The U.S. side agreed to review this list by the end of August 1995.

(8) In order to ensure that information exchanged during technical discussions between U.S. and Russian experts as well as information obtained during technical visits to each other's facilities will be sufficiently protected and not released to a third party, the Russian Research Center "Kurchatov Institute" (RRC "KI") and the Pacific Northwest Laboratory (PNL) signed a confidentiality agreement that provides for the protection of such sensitive information. In addition, representatives from the Russian Ministry of Atomic Energy and the U.S. Department of Energy stated their intention to endorse this agreement by September 20, 1995.

(9) The U.S. provided the Russian side with categories of necessary information on the operating Russian plutonium production reactors that are required for the U.S. to understand the design and operation of these reactors. The Russian side agreed to provide this information to the U.S. on an expedited basis.

(10) Both sides discussed, and reached preliminary agreement upon, draft contracts between RRC "KI" and PNL and noted that all contracts are now in the signature process and that the U.S. will seek to sign these contracts before the end of August 1995.

DONE at Moscow, Russia, in two copies, this 10th day of August, 1995, in the English and Russian languages, each text being equally authentic.

Terry R. Lash

Lev D. Ryabev
For the Ministry of the Russian
Federation for Atomic Energy

Terry R. Lash
For the United States
Department of Energy

RUSSIAN REPLACEMENT POWER PROGRAM

Mr. Myers. Identify by name each person in the Department who participated in the decision to fund this activity despite Congressional guidance to the contrary.

Dr. Lash. As described previously, the activities were funded with FY 1995 funds which were to conduct feasibilities studies. We did not feel this was contrary to Congressional guidance. The decision to sign the agreement to commit the Department to fund the Feasibility Studies was made by the Secretary. The funding arrangement involved Senior Departmental officials, including those in the Offices of Nuclear Energy, Science and Technology, Chief Financial Officer, and Nonproliferation and National Security.

RUSSIAN REPLACEMENT POWER PROGRAM

Mr. Myers. Who made the decision not to go forward with a reprogramming request to Congress when the decision was made to fund this program?

Dr. Lash. As previously described, the Department considers the feasibility studies and reviews within its overall program mission and budget. These activities which do not mortgage the future are not reprogramming. There was no question of reprogramming.

RUSSIAN REPLACEMENT POWER PROGRAM

Mr. Myers. Was this program funded in FY 1995? If so, describe the program activities, the cost of the program, and the source of the funding.

Dr. Lash. As a direct result of the Gore-Chernomyrdin agreement of June 23, 1994 and follow-on agreements between the Department of Energy and the Russian Federation, nuclear replacement power and core conversion studies were initiated in late Fiscal Year 1995. The nuclear replacement power study was to evaluate the feasibility of using new nuclear capacity to replace the heat and electricity presently provided by Russia's plutonium production reactors, so that these reactors could be shut down. The core conversion study was to evaluate the feasibility of implementing a new fuel design that would prevent the production reactors from producing additional weapons-grade plutonium. Phase I of these studies was funded by Department prior-year, Nonproliferation and National Security, and Nuclear Energy funds including fund internally reprogrammed from excess Energy Supply R&D prior-year balances. The cost of the program in Fiscal Year 1995 was $3 million.

FISSILE MATERIALS DISPOSITION

Mr. Myers: Please provide an inventory of surplus weapons-usable fissile materials including location and quantity.

Mr. Rudy: A breakout of the Department of Energy's inventory of surplus weapons-usable fissile materials is shown in a table which I would like to insert in the record. The information follows:

INVENTORY OF SURPLUS WEAPONS-USABLE FISSILE MATERIALS
(in Metric Tons)

Site:	Weapons-grade Plutonium	Highly Enriched Uranium
Pantex Site plus planned dismantlements	21.3	16.7
Rocky Flats Environmental Technology Site	11.9	2.8
Hanford Site	1.7	0.5
Los Alamos National Laboratory	1.5	0.5
Savannah River Site	1.3	22.0
Idaho National Engineering Laboratory Site	0.4	23.4
Oak Ridge Site (including 10 metric tons previously placed under International Atomic Energy Agency safeguards)	--	84.9
Portsmouth Gaseous Diffusion Plant	--	22.5
Brookhaven National Laboratory	--	0.3
Sandia National Laboratories	--	0.2
Other sites (includes Government and non-Government sites, Department of Energy contractors, research institutes, and universities)	0.1	0.5
Totals (may be affected by rounding)	38.2	174.3

Mr. Myers: What is the current cost estimate for storage and ultimate disposal of these surplus fissile materials?

Mr. Rudy: While final cost estimates are not yet complete and the set of storage configurations and disposition technologies finally selected for surplus plutonium disposition have not yet been determined, a preliminary estimate is that the design and construction costs could range from slightly over $1 billion to just over $2 billion over a 6 to 10 year period. Although a portion of that cost could be offset by receipts from the sale of fuel or electricity in reactor burning options, the life cycle cost of providing new facilities and establishing the necessary infrastructure to accommodate the plutonium fuels could significantly exceed the value of the energy.

Unlike plutonium, surplus U.S. highly enriched uranium can be rendered non-weapons-usable by blending it down to low enriched uranium for use in commercial reactor fuel. This is the most rapid path for neutralizing the proliferation threat and is consistent with the course of action now underway in Russia to reduce highly enriched uranium stockpiles. Over time, down blending of the surplus highly enriched uranium for use as commercial low enriched uranium fuel could yield an estimated net value of several hundred million dollars.

The Department is currently completing environmental, technical, cost and schedule analyses for the range of potential decisions on storage and disposition of both highly enriched uranium and plutonium. The Record of Decision for the disposition of surplus highly enriched uranium is scheduled for the second quarter of 1996. The Record of Decision for the long-term storage of all weapons-usable fissile materials and technologies and systems for the disposition of surplus fissile materials is planned for late 1996. Final cost and schedule estimates will be completed later this year to support the Records of Decision.

Mr. Myers: What type of joint technical studies and demonstrations are being conducted with Russia on options for plutonium disposition?

Mr. Rudy: Joint U.S.-Russian studies are being conducted on options for plutonium disposition in six technical areas: conversion and stabilization; storage; immobilization; water reactors; geologic disposition; and fast reactors. Reports on these studies, which provide status on the state of the technologies in each country, including estimates and schedules for implementation are being prepared and integrated into joint reports. These reports are planned to be issued sometime in July 1996. Plans for test and demonstrations are being developed for review and approval by the Joint U.S.-Russian Steering Committee in May 1996.

Mr. Myers: Please describe any activities involving transfer of uranium to the United States Enrichment Corporation, and include funding or revenue transactions.

Mr. Rudy: The Department is completing an Environmental Impact Statement (EIS) on the disposition actions to be taken for surplus highly enriched uranium. The Record of Decision is scheduled for June 1996. The Department's preferred alternative includes transferring 50 metric tons of surplus highly enriched uranium and approximately 7,000 metric tons of natural uranium materials to the United States Enrichment Corporation (USEC) for blend-down and conversion to low enriched uranium for peaceful use in commercial power reactors. A draft agreement has been negotiated with USEC which sets forth a schedule for the transfer of the surplus highly enriched uranium over a six year period beginning at the end of Fiscal Year 1996. Execution of the agreement is pending issuance of the final Environmental Impact Statement, its Record of Decision and passage of the USEC Privatization legislation. When the United States Enrichment Corporation is privatized through sale, several hundred millions of dollars in revenue would accrue to the U.S. Treasury reflecting the value that the market assigns to the transfer of the uranium materials to USEC by DOE.

Mr. Myers: Does this program include planning for ultimate disposal of all surplus plutonium throughout the complex including plutonium such as waste residues, or is this program focused specifically on excess weapons grade plutonium?

Mr. Rudy: The fissile materials disposition program is developing strategies and implementing actions to eliminate surplus weapons-usable fissile materials in a manner that effectively precludes its reuse in nuclear weapons. The stabilization, concentration and ultimate disposition of non-weapons-usable plutonium such as spent nuclear fuel or residues are the responsibility of the Office of Environmental Management. Separated weapons-usable plutonium that may result from stabilization or treatment processes for spent nuclear fuel or residues would become the responsibility of the fissile materials disposition program should it become separated into a weapons-usable form. These additional quantities have been taken into account in program planning efforts. Thus, this program includes disposition of all weapons-usable surplus plutonium that is or is expected to be separated from spent nuclear fuel or residues.

Mr. Myers: The Environmental Management budget includes a request at the Savannah River Site for a new Actinide Packaging and Storage Facility. How is this project integrated with the fissile materials disposition program?

Mr. Rudy: The fissile materials disposition program is developing the strategies and plans for a Department-wide, long-term plutonium storage configuration that is secure, environmentally sound, inspectable and cost effective. A decision on the strategy and site(s) is planned for late 1996. The alternatives under consideration, described in the Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement (PEIS) issued February 1996, include: (1) no action; (2) upgrade at multiple sites; and (3) consolidation of plutonium in a new facility. Savannah River, Hanford, Pantex, Idaho, Nevada and Oak Ridge are being evaluated as potential sites for the consolidation and long-term storage of the Department's plutonium inventories in a new facility. The Rocky Flats site is not a potential site for the consolidation and long-term storage of the Department's inventories of plutonium. In parallel with the efforts to decide on a long-term storage configuration and location, coordinated planning for potential additional interim storage at DOE sites is also ongoing. The coordination is in place to help assure integration of storage decisions and to avoid overlap and duplication. Two examples in this regard include Savannah River Site and Rocky Flats.

The Savannah River Site new Actinide Packaging and Storage Facility would provide SRS with the capability to meet the Defense Nuclear Facilities Safety Board 94-1 recommendations regarding stabilization, repackaging, and interim storage of SRS actinide materials, as well as

facilitate the future deactivation of the canyon facilities. The environmental analysis for this facility is provided in the Final Environmental Impact Statement for Interim Management of Nuclear Materials, October 1995.

If the Record of Decision for the PEIS results in the selection of the no action alternative or if the upgrade alternative were selected and SRS was not selected to accommodate portions or all of the plutonium now stored at the Rocky Flats Environmental Technology Site (RFETS), the SRS new Actinide Packaging and Storage Facility would be completed as currently planned. The facility would provide a capability of handling about 500 packages per year and a storage capacity of 2,000 positions. If the upgrade alternative were selected and SRS were selected to accommodate portions or all of the surplus weapons-usable fissile materials now stored at the Rocky Flats Environmental Technology Site, the scope of the Actinide Packaging and Storage Facility would be changed to increase the vault capacity to about 5,600 positions. If the consolidation in a new facility alternative were selected and SRS were selected as the site for the consolidation, the scope of Actinide Packaging and Storage Facility would be changed to increase the material handling capability to about 4,000 packages per year and vault capacity to 40,000 positions. If SRS were not selected as the site for consolidation, the need to complete the Actinide Packaging and Storage Facility would be re-evaluated considering such factors as the time required to implement the long-term consolidation decision at the other selected DOE sites; impacts on meeting SRS 94-1 commitments; and potential future cost savings at SRS by consolidation of on-site nuclear material storage.

The Rocky Flats Environmental Technology Site (RFETS) is planning to construct a new interim storage facility to store the plutonium materials at the site. Although Department-wide plans are being developed for moving RFETS plutonium to another site as early as possible after a decision to implement either the upgrade at multiple sites or the consolidation in a new facility alternative, RFETS is proposing an interim storage facility as a prudent planning measure in the event long-term storage decisions and implementation are not made and begun in the near term and the plutonium would need to remain at Rocky Flats for a longer period. Therefore, the Department has chosen to request initial design funding for a new vault at Rocky Flats. This would be consistent with Defense Nuclear Safety Board Recommendation 94-3 regarding safety improvements for onsite plutonium. The vault would be sized to accommodate only existing Rocky Flats site inventories. Economic analysis performed by the Department shows a new facility would be more cost effective in this situation than upgrading RFETS' existing facilities if plutonium would need to be stored in the new facility for more than about five years after it is completed. If the Record of Decision results in proceeding with either the upgrade at multiple sites or the consolidation alternative, the new storage facility at Rocky Flats would not be needed.

The fissile materials disposition program has completed a Conceptual Design Report and a Construction Project Data Sheet for the consolidation of plutonium at a new facility in support of project 97-D-140 and will be completing a Conceptual Design Report and Project Data Sheet for the upgrade at multiple sites. If the decision were to consolidate plutonium at a new facility, the Department would proceed with Title I design in FY 1997 as funded by 97-D-140. If the decision were to upgrade at multiple sites, the Department would apply the Title I funds in 97-D-140 to the start of Title I designs at multiple sites in FY 1997. The Department is currently developing plans to implement either decision under 97-D-140.

SAFETY EVALUATIONS MEASURES

Mr. Myers. What measures should be used to evaluate the safety of the Department of Energy facilities?

Dr. O'Toole. From the standpoint of senior Department of Energy management and the U. S. Congress, the best measure of safety and security at Department of Energy facilities is the effectiveness of line safety and security management. Line managers control the resources required to maintain and improve safety and security, they evaluate the performance of subordinate managers who are key to day-to-day actions that create and maintain a safe, secure culture in the workplace, and are the key to the worker empowerment that may be the most effective means of intercepting unsafe conditions before accidents can occur.

The Secretary's five guiding safety and security management principles form a sound basis for measurement of line management effectiveness. These principles are: Line managers are responsible and accountable for safety and security; Comprehensive requirements exist, are appropriate, and are executed; Competence is commensurate with responsibilities; Independent oversight is conducted of Departmental activities; and Enforcement of public laws, international treaties and other legally binding instruments is assured by the Department of Energy.

The first three of these principles form the basis of the independent oversight program conducted by my Office. Safety or security management evaluation, as appropriate, is the focus of each inspection, assessment, and special study.

SAFETY CHARACTERIZATION

Mr. Myers. How would you characterize the safety of Department of Energy facilities as it pertains to the workers and the public?

Dr. O'Toole. Unfortunately, traditional statistical measures do not provide a good benchmark by which we can measure safety of Department of Energy facilities. The unique and unprecedented hazards present at these facilities do not easily permit use of traditional indicators whose focus is on historic performance results (e.g., injuries, illnesses and radiation exposures). However, due in part to its self-regulation in environment, safety and health (ES&H), it has become clear over the past ten years that DOE's operations were not in compliance with Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and other regulations; management had not been sufficiently accountable to ES&H; and few operating contractors were applying progressive industry practices and experience designed to better prevent both radiological and industrial accidents. Studies of particular activities, such as protective force operations, various accident investigations conducted by my Office, and some recent comprehensive inspections indicate that significant safety concerns exist in some areas.

Over the past few years, substantial progress has been made in ES&H compliance and management accountability (which is reflected, in part, by downward trends for reportable environmental releases, lost workday injuries, and reportable radiation exposures). DOE is confronted increasingly with the significant safety hazards associated with thousands of aging facilities being readied for decontamination and decommissioning, coupled with the many thousands of largely inexperienced workers newly charged to accomplish this task over the coming decades. The construction and demolition activities associated with these new missions are among the most hazardous activities to which workers can be exposed. Two fatalities and several serious injuries since the beginning of this year have underscored this emerging concern.

In response, the Department has targeted its safety emphasis on work planning, hazard control and analysis, training, and other preventative approaches aimed at better preparing workers for such hazards. Combined with ongoing safety initiatives such as improved contract clauses, clarified standards, and performance-based oversight (both internal and external), DOE seeks to mitigate the impact to workers and the public of these emerging hazardous activities, and establish model ES&H approaches for such operations.

Also, the Department is subject to oversight by the Defense Nuclear Facilities Safety Board. As reported in the Department of Energy's Annual Report to Congress, "Department of Energy Activities Relating to the Defense Nuclear Facilities Safety Board" for Calendar Year 1995 the Department has reduced the number of open Board Recommendations by 19 percent (from 21 to 17). Six Board Recommendations were closed as a result of Department activities while only two new Board Recommendations were received. In addition, the Department continues to make progress at improving the quality of communication and interaction between the Department and the Board.

Department activities culminating in 1995 led to closure of the following six Board Recommendations: Recommendation 90-2, Codes and Standards, Recommendation 90-4, Rocky Flats Operational Readiness Reviews, Recommendation 90-5, Rocky Flats Systematic Evaluation Program, Recommendation 90-6, Rocky Flats Plutonium in the Ventilation Ducts, Recommendation 92-5, Discipline of Operations During Changes, and Recommendation 92-6, Operational Readiness Reviews.

The Department accepted in whole or in part two new Recommendations received from the Board during 1995:
Recommendation 95-2, Safety Management and Recommendation 95-1, Improved Safety of Cylinders containing Depleted Uranium.

The Department also completed six new Implementation Plans in 1995 in response to Board Recommendations the Department accepted in 1994 and 1995. These Plans define the Department's approach and schedule to resolve the associated safety issues.

OVERSIGHT ASSESSMENTS

Mr. Myers. What types of oversight assessments have been conducted?

Dr. O'Toole. Since December, 1994, my Office has conducted eight comprehensive inspections (four safety inspections and four security inspections). During the same time period, twelve special studies and reviews, three accident investigations, and over three hundred surveillances have been completed. In addition, initial review of 22 facility Operational Readiness Reviews has been completed and nineteen site profiles have been prepared.

Comprehensive inspections consider many technical topics at a single Department of Energy field office or site and typically include two to three weeks of on-site data collection. Reviews and special studies tend to concentrate on a single issue or topic across a representative sample of sites, with data collection spread over one or two months at various locations across the complex. Accident investigations are inquiries into the specific circumstances surrounding a serious accident, including an analysis to determine the root cause of that accident. Surveillances are formal assessment activities conducted by Environment, Safety, and Health Residents stationed at key facilities and sites throughout the Department of Energy complex. Our mission includes review and oversight of Operational Readiness Reviews to ensure that the review is comprehensive and accurate. Site profiles are living, continuously maintained summaries of site characteristics, including an analysis determining the current safety management issues at the site.

ASSESSMENT FINDINGS

Mr. Myers. What have been the major findings of these assessments in each area?

Dr. O'Toole. Our oversight activities for Fiscal Year 1995 are summarized and analyzed in the Independent Oversight Annual Report. The major conclusions reached in this document are: line management is responsible and accountable. Department of Energy and contractor managers demonstrate an increased understanding of the importance of identifying roles and responsibilities for safety and security management. Notwithstanding the increased understanding of the importance of identifying roles and responsibilities, roles and responsibilities for safety and security management have been poorly defined and communicated, and not effectively institutionalized. The Department of Energy still fails to demonstrate a culture wherein line managers are held accountable for safety performance.

The second set of conclusions refers to the principle that comprehensive requirements exist, are appropriate, and are executed. Department of Energy policy, requirements, and guidance must be clearer and more consistent. Department of Energy is taking action to improve in this area, but the efforts are not complete and cannot be evaluated at this time. Adequate and consistent implementation of policy, requirements, and guidance is still lacking, as is Department of Energy's emphasis on the importance of appropriate implementation. Significant deficiencies are evident in the understanding and documentation of the facility authorization basis, including hazards analyses and current facility configurations.

The third set of conclusions refers to the principle of competence commensurate with authority. Insufficiency of competent staff tends to be confined to certain disciplines or activities, but may be observed at many sites throughout the complex. Training of Department of Energy line personnel is not receiving adequate management emphasis. A transitioning workforce compounds deficiencies in resources and skills.

Independent oversight has become an operational activity, but many formal actions required to formalize its policies and procedures remain to be completed. A significant number of products were produced, providing a comprehensive sample of Department of Energy safety and security management effectiveness. Further improvements in analysis capabilities and increased integration of safety and security oversight activities will improve efficiency.

COST SAVINGS

Mr. Myers. What types of cost savings are to be gained by implementing these recommendations?

Dr. O'Toole. In order to remain independent of line management, the oversight process does not make specific recommendations, but rather identifies shortcomings to line management for correction. These shortcomings often take the form of identifying management shortfalls, rather than specific equipment requirements or detailed maintenance requirements, although these are conveyed when observed. For this reason, specific cost savings resulting from independent oversight are not directly quantifiable, however, the potential is large. With operating cost for each DOE site reviewed running in excess of approximately $600 million, even apparently small efficiencies yield large cost savings. During 1995, opportunities for increased efficiencies were identified at Idaho National Engineering Laboratory, Rocky Flats Plant, Savannah River, Hanford, and Pantex. In addition, complex wide Oversight activities identified cost efficiencies in the programs dealing with identification and eradication of suspect/counterfeit parts, radiological controls, occurrence reporting, and emergency operations. The best estimate of the annual cost savings from the specific efficiencies identified during 1995, if implemented by DOE management, is $10 - 15 million.

In addition to increased efficiency, Office of Oversight recommendations would reduce the large number of accidents and environmental occurrences experienced by the Department. Each such incident has a significant dollar cost as well as the cost in human terms. Within the Department, approximately 5000 worker injuries occur annually that do not result in loss of life or limb. The Department has determined that each such injury costs approximately $10,000, amounting to more than $50 million annually. Improvements in safety management have the potential to greatly reduce this expense. Examples include the identification of imminent hazards related to crane operations at one site, the identification of unsafe work practices during (non-fatal) event investigations, the identification, during Safety Management Evaluations, of recurring violations of safety requirements at two sites, and the identification of unnecessary, hazardous protective force training activities during Safeguards and Security Inspections. It is estimated that the steps taken by site management in response to identification of these issues have averted personnel injuries that could have cost the Department $1.5 million annually.

In addition, since January 1995 the Office of Oversight has conducted investigations of four Type A accidents in which there was loss of life. In each case, the Office of Oversight identified correctable safety issues as direct contributors to the accident. The implementation of the identified corrective actions before the accidents occurred would have saved the Department an estimated $4 million over a period of slightly more than one year.

In addition to these savings and cost avoidances associated with improved safety practice, the Office of Oversight has impacted the number of environmental occurrences experienced by the Department. Most of the reductions in environmental release incidences between 1994 and 1995 are attributable to increased management attention -- a principle result of Office of Oversight activities. Reductions yield a $3 million annual cost savings for the Department. In 1994, environmental penalties alone cost over $1.3 million and this does not include the substantial cost of clean up and increased operational clean-up.

Reductions in incidents of the types identifies above clearly have significant potential for cost savings, far beyond the annual budget for the Office of Oversight. We believe that the most effective means of achieving cost savings in this area is to identify and correct safety program management weaknesses that are the root cause of many incidents, rather than to address each incident individually from Department of Energy Headquarters. Inspections, analyses, studies, reviews, and surveillances keyed to the Secretary's management principles have been successful in identifying many such weaknesses and, if line management effectively addresses these weaknesses, a significant reduction in reportable incidents and a significant cost savings will accrue.

OVERSIGHT FUNDING

Mr. Myers. For the Oversight funding of $14.5 million, please provide details of the requested funding level including the amount allocated for support service contractors, supplies/materials/etc.

Dr. O'Toole. The requested level for FY 1997 for support service contractors, supplies/materials/etc., for the Office of Oversight is $13.7 million, $0.5 million for the representative to the Defense Nuclear Facilities Safety Board, and $0.3 million for the Enforcement function. These programs total $14.5 million for the Oversight budget.

OVERSIGHT SUPPORT CONTRACTORS

Mr. Myers. To the extent funding is provided for support service contractors, please provide specific details outlining the tasks to be performed and the deliverables.

Dr. O'Toole. Support service contractors are used to augment the technical capabilities of the staff. All inspections, special studies, and reviews are performed by a mixed federal-contractor team under the leadership of a federal staff member who is directly responsible for the final report. Therefore, there are few formal deliverables specified for support service contractors other than procedural and administrative reports.

A major portion of the support service contractor resources are applied to the conduct of assessments (inspections), with the national-level technical expertise specialists in technical disciplines joint federal-contractor effort led by the federal inspection chief. Likewise, special studies, reviews, and other analyses are either entirely federally staffed or are a joint federal/contractor effort led by a federal staff member who is responsible for the final report and all deliverables associated with the effort. Accident investigations follow a similar pattern with an even higher percentage of the effort allocated to federal staff due to the sensitive nature of such matters. Surveillances are conducted by on-site federal staff. Contractor personnel provided technical writers and editors in support of most Office of Oversight products.

The Office of Oversight uses contractors to provide support for two primary reasons: National-level technical expertise is required to credibly evaluate DOE policies, programs, and facilities. Such expertise is often not available within the government. The most experienced and qualified technical specialists are typically assigned to line organizations and/or facilities and are not available for oversight activities (because their time is committed and because of conflict of interest concerns). The second primary reason is Inspections, evaluation, and special studies involve the need for a number of specialists in certain disciplines for a defined period of time. Contractors are used to provide surge capacity for such activities.

These two tables, which I would like to insert for the record, provide an overview of support contractor support to the Office of Oversight. The first table presents the technical support needs of each of the four offices making up the Office of Oversight. The second displays the allocation of contractor support to the various activities conducted by the several offices. The fact that the allocation is by function rather than by Office is a reflection of the ongoing integration of the safety and security management evaluation process.

Technical Contractor Support Requirements by Office of Oversight Organizational Element

Office	Technical Support Requirements
Security Evaluations	- Inspection Planning and Support - Inspectors/technical specialists for: Evaluations/inspections Readiness/issue reviews - Technical specialists to participate in special studies - Safeguards and security field computer support - Technical specialists to participate in accident/incident investigations - Highly specialized technical discipline (e.g., material control and accountability, computer security) support on a continual basis - Training and qualification program implementation - Safeguards and security trending, analysis, policy issues - Methods and tool development - Input to strategic plans, Site Profiles, Annual Reports, etc
Environment, Safety, and Health Evaluations	- Evaluation planning and support - Evaluators for: Evaluations/inspections Readiness/issue reviews - Technical specialists to participate in special studies, accident evaluations - Environment, safety, and health field computer support - Training and qualification program implementation - Environment, safety, and health trending, analysis, policy issues - Methods and tool development - Input to strategic plans, Site Profiles, Annual Reports, follow-up activities, etc
EH Residents	- Surveillance/review planning and support - Training and qualification program implementation - Trending, analysis, policy issues - Methods and tool development - Input to strategic plans, Site Profiles, Annual Reports, etc
Planning and Analysis	- Site Profiles - Scheduling - Department wide policy and trend analysis - Special studies - Information management - Training and qualification development and implementation - Annual report and trending report data collection

Allocation for Support Contractors From Oversight Funding
($000)

Support Contractor Funding by Functional Task Area	FY 1995	FY 1996	FY 1997 Request
ES&H Resident Activities	$ 1,500	$ 1,250	$ 1,100
Assessments	11,900	11,100	10,851
Accident Investigations	700	495	400
Analyses	3,000	2,400	1,400
Enforcement (Office of Nuclear and Facility Safety)	649	300	275
DNFSB (Office of Representative to the Defense Nuclear Facilities Safety Board)	551	700	500
Total	$18,300	$16,245	$14,526

CONTRACTUAL SUPPORT

As can be seen from the support allocation, we have achieved a substantial reduction in oversight support contractor expenses since FY 1995. This trend toward decreased reliance on contractors will continue subject to our need for access to a pool of individuals with a wide range of technical expertise for specialized needs (e.g., assessing a particularly specialized area). Continued support is needed for work requiring national-level expertise and surge capacity for major assessments (inspections, evaluations, special studies, and investigations).

Our overall strategy is to continue our efforts to assemble a small core group of well-respected and extremely versatile contractors that are fully-committed to the Oversight program and have no conflict of interest. This core group can provide ongoing support and participate in major assessments. We want this core group to have continuity and a commitment to the improvement of environment, safety, health, safeguards, and security at Department of Energy facilities. In this manner, inspected facilities will have no reason to even question that contractors providing support to oversight are acting in the best interests of the Department and are not positioning themselves for future work at the facilities they are reviewing.

We have reduced the level of contractor support from that employed by the several previous oversight offices when they operated independently. We believe that another large reduction would significantly delay and/or threaten key ongoing activities. Furthermore, the activities which contractors now perform are better suited for contractors than federal staff because of the greater flexibility of resource usage and the opportunity to immediately replace individuals that do not demonstrate superior capabilities and versatility.

The nuclear safety enforcement and investigators program purchases contractor technical experts on a temporary as needed basis in various engineering disciplines and legal specialties to support the DOE Enforcement staff in the conduct of enforcement investigations. Because it is impossible to forecast the specific engineering and legal specialty requirements for any given fiscal year, it is not cost effective nor realistic to maintain a large federal staff to provide expertise on an ad hoc/contingency basis.

Contractor expertise purchased by the Office of the Departmental Representative to the Defense Nuclear Facility Safety Board provides assistance in maintaining the Department/Defense Board commitment management system including identifying the technical issues and documenting, grouping and prioritizing issues within the Department's policies and guidance for Defense Board interface, including recommendations/responses, implementation plans, reports and training; maintenance of control repository of Defense Board communications and summaries of Defense Board activities.

EPIDEMIOLOGICAL STUDIES

Mr. Myers. Please identify each epidemiological study that has been conducted by the Department, the beginning and ending date, the cost, and the performing entity.

Dr. O'Toole. Epidemiologic studies have been conducted through Department of Energy grants to state health departments and through intramural research. Under a Memorandum of Understanding (MOU) with the Department of Health and Human Services, epidemiologic studies are also conducted through contracts, grants and cooperative agreements from the Centers for Disease Control and Prevention (the National Center for Environmental Health & National Institute for Occupational Safety and Health).

The epidemiological studies conducted by the Department of Energy are shown in a table which I would like to insert for the record. The information follows:

[Insert for the Record]

Study	Beginning Date	End Date	Performing Entity	Cost
State Health Departments, California: Santa Susana Field Laboratory Health Studies - Rockwell Occupational Health Study	9/15/91	9/31/96	California Public Health Foundation and the University of California at Los Angeles School of Public Health	$1,400,000
State Health Departments, New Mexico: Los Alamos Cancer Rate Study	8/20/91	4/30/96	New Mexico Department of Health	$743,000
Intramural Studies, Tatum Dome Mortality Study	Fall of 1994	5/1/95	Department of Energy, Office of Epidemiologic Studies	$100,000
National Center for Environmental Health, An epidemiologic evaluation of childhood leukemia and paternal exposure to ionizing radiation	9/30/92	9/29/95	California Public Health Foundation	$126,805
National Center for Environmental Health, An epidemiologic evaluation of childhood leukemia and paternal exposure to ionizing radiation	9/30/92	9/29/97	University of Colorado	$1,185,500

Epidemiologic Studies

Study	Beginning Date	End Date	Performing Entity	Cost
National Center for Environmental Health, Epidemiologic evaluation of thyroid disease and exposures to radioactive fallout from atomic testing in the Pacific	8/1/94	7/31/97	Republic of the Marshall Islands	$700,000
National Institute for Occupational Safety and Health, Multiple myeloma among workers exposed to ionizing radiation and other physical and chemical agents	10/1/93	3/28/97	University of North Carolina at Chapel Hill	$814,500
National Institute for Occupational Safety and Health, Mercury exposed workers at Y-12	10/1/93	9/30/96	Oak Ridge Associated Universities	$707,100
National Institute for Occupational Safety and Health, Childhood leukemia and parental occupational exposure to ionizing radiation	10/1/92	12/31/96	Battelle Pacific Northwest National Laboratory	$1,052,300
National Institute for Occupational Safety and Health, Mortality patterns among uranium enrichment workers at the Portsmouth Gaseous Diffusion Plant	2/1/92	6/30/96	NIOSH & Oak Ridge Associated Universities	$496,800

Study	**Beginning Date**	**End Date**	**Performing Entity**	**Cost**
National Institute for Occupational Safety and Health, Mortality among civilian nuclear workers at the Portsmouth Naval Shipyard	10/1/93	9/30/97	NIOSH & Oak Ridge Associated Universities	$599,700
National Institute for Occupational Safety and Health, Technical performance evaluation of historical plutonium bioassay procedures	10/1/93	12/31/95	New York University	$464,200
National Institute for Occupational Safety and Health, Case-control study of multiple myeloma at the K-25 plant	10/1/95	9/30/96	NIOSH & Oak Ridge Associated Universities	$290,100
National Institute for Occupational Safety and Health, Epidemiologic Study of Workers at the Idaho National Engineering Laboratory	10/1/92	9/30/97	NIOSH & Westat, Incorporated	$2,488,600
National Institute for Occupational Safety and Health, Epidemiologic evaluation of cancer and occupational exposures at the Rocky Flats Plant	10/1/93	9/30/98	NIOSH & Colorado Department of Public Health & Environment	$3,029,800

Epidemiologic Studies

Study	Beginning Date	End Date	Performing Entity	Cost
NIOSH, Job Stress Study	10/1/95	9/30/98	Boston University School of Public Health	$1,090,300
NIOSH, Mortality among female nuclear weapons workers	10/1/94	9/30/97	University of Texas Medical Branch at Galveston	$719,000
NIOSH, Accounting for errors in radiation dose estimates	10/1/94	9/30/97	Battelle Pacific Northwest National Laboratory	$132,000
NIOSH, Glycophorin A Biodosimetry in I-131 treated patients	10/1/94	9/30/97	University of Pittsburgh	$230,000
NIOSH,Study of heat stress and performance in carpenters at DOE sites	10/1/95	8/31/96	UBC Health and Safety Fund	$564,000
NIOSH, Lung fibrosis in plutonium workers	10/1/95	8/31/98	National Jewish Center for Immunology and Respiratory Medicine	$436,000
NIOSH, Uranium miner issues	10/1/95	8/31/96	University of Southern California	$535,000
NIOSH, Chronic beryllium disease among beryllium-exposed workers	10/30/95	9/29/00	National Jewish Center for Immunology and Respiratory Medicine/Michigan State University	$400,000

RECORDABLE ACCIDENT RATE

Mr. Myers. How does the Department's record in recordable accident rates compare to industry averages?

Dr. O'Toole. Overall, reportable accident rates are about 50% lower than the average reported by the Bureau of Labor Statistics. The Department's Total Reportable Case Rate for 1991-1995 was 3.96 cases per 200,000 hours worked. The Bureau of Labor Statistics Average Total Reportable Case Rate for 1989-1993 was 8.6 cases per 200,000 hours worked. In spite of this low overall rate, however, some specific areas of concern were identified by my Office during Fiscal Year 1995, including hoisting and rigging activities and safeguards and security operations. In addition, substantial weaknesses were observed in criticality safety and fire prevention at specific sites. As I have already noted, however these traditional statistics are not a good benchmark for DOE's unique hazards.

SAFETY PERFORMANCE IMPROVEMENTS

Mr. Myers. Can you quantify how safety performance such as lost work days and radiation exposure have improved at Department of Energy facilities?

Dr. O'Toole. The Department's Lost Work Day Rate has declined steadily over the last several years, from 63.46 days per 200,000 hours worked in 1991, to 33.12 days per 200,000 hours worked in 1995. The Lost Work Day Case rate, however, has not shown a corresponding decrease and this fact is of concern to us. Radiation exposure has also declined steadily, from 85 millirem per individual with measurable exposure in 1990, to 66 millirem per individual with measurable exposure in 1994.

AVERAGE TRAVEL FUNDING

Mr. Myers. The average travel funding per FTE is in excess of $ 9,400. Please provide details relative to the number of the total FTEs (106) who would be expected to travel and the expected calendar days those FTEs would be in travel status. Provide appropriate calculations.

Dr. O'Toole. Of the 106 FTEs, approximately 100 individuals travel per annum. In FY 1996 projections are as follows: eighty individuals traveled on inspections and special studies. Comprehensive inspections average 92 travel days per annum; special studies average 25 travel days per annum; and meetings and training average 10 travel days per annum.

For FY 1996 average calculations:

Average airfare:	$ 555
Average per diem (5 days @ $99 per day)	495
Average Rental Car (cost per traveler)	50
Transportation to and from airports, parking	50

Total average for a 1 week trip	$1,150

Projections for inspection travelers (80 individuals) averaged 11 trips (55 days per annum) during FY 1996 for an approximate total of $12,650 per individual. Total for FY 1996 is projected at approximately $1,000,000.

Projections for non-inspection travelers (15 individuals) averaged 3 trips (15 days per annum) during FY 1996 for an approximate total of $3,450 per individual. Total for FY 1996 is projected at approximately $50,000.

Projections for Health Studies travelers averaged $8,847 per annum for their travel during FY 1996. These 22 travelers had trips to the Marshall Islands, to States having Health Agreements, as well as Department of Energy sites conducting epidemiological studies. Total for FY 1996 is projected at approximately $175,000.

We are making a concerted effort to reduce team size, share rental cars, and reduce overall travel expenses for FY 1997.

NATIONAL DEFENSE AUTHORIZATION ACT

Mr. Myers. By year, what has been the total cost of executing section 3161 of the National Defense Authorization Act of Fiscal Year 1993, throughout the Department of Energy.

Mr. DeGrasse. Approximately $59 million of the cost at Oak Ridge in FY 1994, involved costs of an early retirement plan that was funded from excess assets within the pension fund. As a result, overall appropriated funds associated with this program over the period fiscal year 1993-to-date are approximately $644 million.

The total cost of worker and community transition across the Department of Energy from fiscal years 1993 through February 1996 is shown in a table which I would like to insert for the record. The information follows:

COST OF WORKER AND COMMUNITY TRANSITION

(By Site and Year)

SITE	FY 1993	FY 1994	FY 1995	FY 1996 (thru 2/96)	Total
Richland			$78,925,000	$5,502,460	$84,427,460
Idaho		$830,000	$42,120,750		$42,950,750
LLNL					
Nevada		$8,164,800	$8,798,400	$7,140,000	$24,103,200
SNL				$8,650,800	$8,650,800
LANL			$8,983,880	$3,900,600	$12,884,480
WIPP					
Rocky Flats	$5,084,000	$16,543,500	$56,863,200		$78,490,700
Kansas City	$7,528,400	$20,791,600			$28,320,000
Pantex					
Mound	$453,600	$6,091,200	$3,422,400		$9,967,200
Fernald		$6,477,000	$4,641,000	$2,451,000	$13,569,000
Savannah River	$24,567,040	$17,973,680	$72,879,000	$3,981,600	$119,401,320
Oak Ridge		$86,293,070	$1,756,150	$4,738,000	$92,787,220
Pinellas	$28,186,900	$9,229,100	$20,335,300	$1,708,000	$59,459,300
Work Force Costs	**$65,819,940**	**$172,393,950**	**$298,725,080**	**$38,072,460**	**$575,011,430**
Community Transition	$625,000	$68,286,000	$40,753,000	$18,100,000	$127,764,000
Grand Total	**$66,444,940**	**$240,679,950**	**$339,478,080**	**$56,172,460**	**$702,775,430**

DOE CONTRACTOR EMPLOYMENT BY SITE

Mr. Myers. Please provide a table by site showing DOE contractor employment by site from 1988 through FY 1997.

Mr. DeGrasse. The Department does not maintain a compilation of subcontractor employment. Projections are not available to determine work force reductions by site beyond the current time due to uncertainties over future budgets, work allocations by site, and the work force implications of those decisions. The Department has estimated that overall prime contractor work force levels will decline to approximately 113,700 by the end of fiscal year 1996.

The prime contractor employment figures through February 1996 are shown in a table which I would like to insert for the record. The information follows:

DOE PRIME CONTRACTOR EMPLOYMENT:
FISCAL YEARS 1988 - 1996

SITE	1988	1989	1990	1991	1992	1993	1994	1995	1996
Richland	11,449	11,683	12,730	14,127	15,107	16,062	17,047	13,197	12,838
Idaho	5,773	6,510	7,548	7,988	7,901	7,810	7,524	6,033	6,033
LLNL	8,007	8,042	8,042	8,158	7,981	8,014	7,321	7,372	7,372
Nevada	8,035	7,996	7,713	7,390	6,670	5,548	5,068	3,940	3,102
SNL	8,372	8,432	8,705	8,804	8,473	8,477	8,458	8,527	8,190
LANL	7,442	7,667	7,402	6,992	7,203	7,293	7,024	6,708	6,511
WIPP	375	506	603	714	775	799	735	640	640
Rocky Flats	5,275	5,312	6,415	7,521	7,302	7,505	6,698	4,418	4,418
Kansas City	6,946	6,829	6,414	5,497	4,489	4,170	3,289	3,563	3,563
Pantex	2,627	2,573	2,390	2,492	2,673	3,020	3,230	3,348	3,348
Mound	2,219	2,150	2,149	2,150	1,741	1,713	1,337	1,163	1,163
Fernald	1,509	1,122	1,128	1,203	1,489	2,296	2,385	2,203	2,108
Savannah River	10,629	16,403	17,663	20,185	20,979	19,788	18,922	16,064	14,914
Oak Ridge	15,651	15,965	15,934	17,200	17,257	17,437	17,215	16,580	16,330
Pinellas	1,710	1,698	1,667	1,618	1,569	1,100	1,007	669	636
SUBTOTAL	**96,019**	**102,888**	**106,503**	**112,039**	**111,609**	**111,032**	**107,260**	**94,425**	**91,166**
Other Sites	31,012	29,277	34,086	33,574	37,077	30,436	28,932	27,500	26,691
GRAND TOTAL	**127,031**	**132,165**	**140,589**	**145,613**	**148,686**	**141,468**	**136,192**	**121,925**	**117,857**

Note FY 96 figures reflect employment through February 1996

ELIMINATED PRIME CONTRACTOR POSITIONS

Mr. Myers. By program and sites, how many contractor positions have been or are expected to be eliminated through FY 2000?

Mr. DeGrasse. The Department is not able to make accurate projections through the year 2000 due to budget uncertainties, associated work assignments and attendant work force implications of those assignments.

The number of prime contractor positions eliminated at DOE sites by program beginning with fiscal year 1993 through February 1996 are shown in a table which I would like to insert for the record. The information follows:

ELIMINATED PRIME CONTRACTOR POSITIONS

(By Program and Site)

Program	Site	FY 93 thru FY 96 to date (Actuals)
Environmental Management	Richland	4,208
	Idaho	1,541
	Rocky Flats	2,887
	Mound	590
	Fernald	531
	Savannah River	2,410
	Oak Ridge	888
Defense Programs (Funded through the Office of Worker and Community Transition)	Nevada	2,974
	SNL	356
	Los Alamos	513
	Rocky Flats	448
	Kansas City	1,200
	Savannah River	2,836
	Oak Ridge	555
	Pinellas	980
Other Programs		2,954
Total		25,872

Note. Other Programs also includes over 550 Energy Research personnel separated from Oak Ridge.

FUNDING BY SITE

Mr. Myers. What is the total amount of funding provided to each site since this program was initiated?

Mr. DeGrasse. Funding by site for both work force and community transition is shown in a table which I would like to insert for the record. The information follows:

FUNDING PROVIDED FOR WORKER AND COMMUNITY TRANSITION PROGRAM TO DATE

(By Site and Type)

Site	Work Force Transition	Community Transition	Total
Richland	$84,427,460	$6,327,000	$90,754,460
Idaho	$42,950,750	$5,325,000	$48,275,750
LLNL			
Nevada	$24,103,200	$5,700,000	$29,803,200
SNL	$8,650,800		$8,650,800
LANL	$12,884,480	$5,000,000	$17,884,480
WIPP			
Rocky Flats	$78,490,700	$20,723,000	$99,213,700
Kansas City	$28,320,000		$28,320,000
Pantex			
Mound	$9,967,200	$15,517,000	$25,484,200
Fernald	$13,569,000		$13,569,000
Savannah River	$119,401,320	$25,795,000	$145,196,320
Oak Ridge	$92,787,220	$32,052,000	$124,839,220
Pinellas	$59,459,300	$10,500,000	$69,959,300
Subtotal	**$575,011,430**	**$126,939,000**	**$701,950,430**
Other Sites		$825,000	$825,000
Grand Total	**$575,011,430**	**$127,764,000**	**$702,775,430**

Note. The $825,000 funded for Community Transition at Other Sites includes $325,000 for Portsmouth and $500,000 for the Energy Technology Engineering Center.

DOWNSIZING OF THE DEFENSE PRODUCTION SITES

Mr. Myers. Now that downsizing the defense production sites has been virtually completed, why is this program still necessary?

Mr. DeGrasse. Work force restructuring at defense facilities has not been fully completed and will continue during fiscal year 1997. For instance, we anticipate completing closure of the Pinellas Plant during FY 1997. This will involve separation of approximately 500 workers, with separation benefits mandated by contract of approximately $25 million at just this one site. Defense Programs anticipates the likelihood of work force restructuring at other sites it manages during the fiscal year as well. The request is 20 percent below that appropriated in fiscal year 1996, and 42 percent below the fiscal year 1995 total funding, in recognition that the scope of restructuring at defense facilities is declining.

Overall, since the beginning of FY 1995, approximately one third of worker benefits under work force restructuring conducted by the Department has been related to the end of the nuclear production mission, and therefore funded from this appropriation. The remaining two thirds, due to improved operational efficiencies or to meet budget constraints, have been provided from within the affected program budgets.

In addition, the Energy and Water Development Appropriations Conference Report, dated October 26, 1995, specifically prohibited the use of appropriations from Environmental Management or accounts other than worker and community transition for community transition purposes. The communities affected by significant employment reductions are facing, demonstrable economic impact.

Given the time necessary to bring economic development activities to fruition, to get the best return on our investment in this program, we must follow through on the investment to date with continued support in Fiscal Year 1997.

SAVINGS FROM CONTRACTOR PERSONNEL REDUCTIONS

Mr. Myers. Annual estimated savings of $3 billion dollars are claimed as a result of contractor personnel reductions. Please explain how this figure is calculated.

Mr. DeGrasse. The annual estimated savings of $3 billion reflects an estimate of changes in the Department's budget that have been realized as a result of reducing more than 30,000 prime contractor personnel between the end of fiscal year 1992, the peak year for prime contractor employment, and February 1996. The figure represents a mid-point between the direct savings resulting from pay and benefits provided to the contractor work force, and the fully weighted cost, including associated overhead, of these workers. This mid-point was selected in recognition that these reductions may not achieve the full rate of overhead reduction. The direct compensation cost figure is $61,175 per employee. Multiplied by the 30,000 prime contractor separations to date, these direct savings are $1.9 billion. The fully weighted cost per contractor employee is approximately $125,000. Multiplying this figure by the number of separations provides a fully weighted savings of $3.9 billion.

SUMMARY OF COMMUNITY TRANSITION FUNDING AND ACCOMPLISHMENTS

Mr. Myers. Please describe the jobs which have been created by community transition activities in FY 1995, FY 1996 and proposed for FY 1997.

Mr. DeGrasse. The following are two examples of jobs created by community transition activities:

Mound Flexible Circuits. The flexible industry is responding to demand for electronic devices that are not only smaller, but faster, lighter and smarter. These bendable printed wiring boards allow for miniaturization, style, and dynamic performance. Some examples of use of flexible circuits included cellular phones, lap top computers, cameras, disk drives, printers and sensors. Mound Flexible Circuits has hired 25 people who design, engineer and manufacture the components for the above products. These components are then shipped overseas for assembly. Mound Flexible Circuits plans to run a three-shift operation with 125 employees by 1997.

Constellation Technologies, Inc. Constellation Technologies moved into the Pinellas Plant in October, 1995. The company is developing portable radiation detection equipment to monitor nuclear weapons proliferation, environmental hazards, and provide data on geology of planetary surfaces. Constellation is currently occupying 6,000 square feet of the Plant to grow mercuric iodide crystals for radiation detectors, and other scientific projects. Constellation employs 21 scientists, plans to hire an additional 81 scientists and managers in 1996 and has formally requested another 80,000 square feet of space for future operations.

Information by site through March 1996, on jobs created to date and projections through the year 2000, are shown in a table which I would like to insert for the record: The information follows:

Summary of Community Transition Funding and Accomplishments

Office of Worker and Community Transition

SITE	Funding	Spent	New or Retained Jobs	New Jobs Projected thru 2000	New or Expanded Businesses	New Businesses Projected thru 2000
Hanford	$6,327,000	$6,327,000	150	1,250	24	75
Idaho	$5,325,000	$325,000	168	700	18	18
Nevada[1]	$5,700,000	$707,000	n/a	2,275	2	n/a
Los Alamos[2]	$5,000,000	$0	n/a	n/a	n/a	n/a
Rocky Flats	$20,583,000	$15,082,000	143	1,480	61	121
Oxnard	$140,000	$94,000	14	31	1	n/a
Mound	$15,517,000	$4,898,000	300	500	19	50
Portsmouth[2]	$325,000	$0	n/a	n/a	n/a	n/a
Savannah River	$25,795,000	$1,534,000	516	1,200	5	7
Oak Ridge	$32,052,000	$31,500,000	2,606	11,065	181	700
Pinellas	$10,500,000	$3,500,000	223	1,600	18	30
ETEC	$500,000	$0	n/a	n/a	n/a	n/a
TOTAL	$127,764,000	$63,967,000	4,120	20,101	329	1,001

[1] Temporary jobs available up to 6 to 8 years

[2] Planning grant received recently; projected jobs unknown

ECONOMIC DEVELOPMENT ACTIVITIES

Mr. Myers. Please provide for fiscal years 1995, 1996 and 1997 by major field element: (a) what criteria each field element is using to define and limit economic development activities, and (b) what funding sources and accounting treatments are being used and followed respectively, for various field elements.

Mr. DeGrasse. (a) The field elements are currently using "Guidance in Support of Economic Development Activities," August, 1994, and the "Interim Planning Guidance for Contractor Workforce Restructuring," April, 1995, to assist in identifying economic development projects that support funding approval. The current guidance awards funds based on the proposed project's ability to create jobs that employ dislocated DOE personnel; stimulate local economic growth; promote commercialization of site-developed technology; and reuse Department facilities compatibly with the site's continuing mission consistent with environmental requirements. Revisions to the guidance are underway to increase accountability and to formalize the project selection process. The revised guidance will focus on cost/benefit analysis, the requirement of project justification and the development of performance measures criteria such as job creation, personal property transferred and real property leased. It will also address accountability and traceability issues post-award.

(b) Funding is authorized under 3161 of the National Defense Authorization Act for Fiscal Year 1993 and matching funds from other non-DOE sources. All recipients of funds under this authorization, will comply with OMB Circular No. A-133 (Audits of Institutions of Higher Education and Other Non-Profit Institutions) or OMB Circular 128 (Audits for State and Local Governments).

Mr. Myers. Additionally, what Headquarters policy guidance has been promulgated to ensure compliance with the report language accompanying the FY 1996 Energy and Water Development Appropriations Act to limit all funding for economic development activities to funding provided in the worker and community transition program?

Mr. DeGrasse. The Energy and Water Development Appropriations Conference Report, dated October 26, 1995, specifically prohibited the use of appropriations to fund economic development activities other than funds provided to Office of Worker and Community Transition. The Office of Environmental Management reemphasized this guidance in a memorandum to the field dated February 21, 1996. Consistent with the conference report language, we are not aware that any DOE site is funding economic development activities through overhead accounts.

DOE COMMUNITY TRANSITION FUNDING BY SITE

Mr. Myers. Provide a list of all projects and the amount of funding for each economic development initiative funded in fiscal years 1994, 1995, 1996 and proposed for 1997.

Mr. DeGrasse. Funding for the remainder of FY 1996 and FY 1997 will be determined through the review process I described and within available resources. Funding by project is shown in a table which I would like to insert for the record. The information follows:

DOE COMMUNITY TRANSITION FUNDING

(BY SITE)

SITE/OPS OFFICE	PROJECT DESCRIPTION	APPROVAL DATE	FUNDING $ (000's)
Hanford	Agri-Business Technology Commercialization & Development	Feb-94	$100
	Tri-City Industrial Development Council Planning Grant	Apr-94	$114
	Tri-City Industrial Development Council Planning Grant	Jan-95	$113
	Hanford Economic Transition Initiatives	Oct-94	$6,000
Subtotal			$6,327
Energy Technology Engineering Center	Economic Development Implementation Grant	Mar-96	$500
Idaho	Eastern Idaho Economic Development Council Planning Grant	Mar-95	$325
	Eastern Idaho Economic Development Council Implementation Grant	Nov-95	$5,000
Subtotal			$5,325
Los Alamos	Community Transition Implementation Grant	Nov-95	$2,200
	Community Transition Implementation Grant	Mar-96	$2,800
Subtotal			$5,000
Mound	Economic Development Seed Money	Oct-93	$1,000
	Economic Development Seed Money	Mar-94	$3,000
	Community Reuse Organization Planning Grant	Jul-94	$500
	City of Miamisburg Economic Development Implementation Grant	Sep-94	$5,900
	City of Miamisburg Economic Development Implementation Grant	Nov-94	$4,100
	Facilitate Site Access for Economic Development	Mar-95	$1,017
Subtotal			$15,517
Nevada	Communications System for State Economic Development Authorities	Apr-94	$200
	Solar Enterprise Zone Project	May-95	$3,000
	Community Transition Implementation Grant	Mar-96	$2,500
Subtotal			$5,700
Oak Ridge	Community Reuse Organization Planning Grant	Sep-93	$300
	Manufacturing Skills Campus	Oct-93	$7,302
	Technology 2020	Jan-94	$1,500
	Manufacturing Skills Campus	Jun-94	$10,000
	Manufacturing Technology Centers	Jun-94	$10,000
	Regional Economic Development Initiatives	Aug-94	$2,850
	Land and Facilities Reuse Initiative	Sep-95	$100
Subtotal			$32,052
Pinellas	Economic Development Seed Money	Oct-93	$1,000
	Economic Development Seed Money	Jan-94	$3,000
	Tampa Bay Transition Task Force	Mar-94	$500
	Economic Development Implementation Grant	Sep-94	$6,000
Subtotal			$10,500
Portsmouth	Planning Grant	Nov-95	$325
Rocky Flats	Economic Development Seed Money	Oct-93	$1,000
	Community Assistance	Nov-93	$500
	National Conversion Pilot Project	May-94	$1,900
	Economic Development Seed Money	Jul-94	$3,000
	National Conversion Pilot Project II	Dec-94	$9,000
	National Conversion Pilot Project Market Assessment	Jan-95	$83
	Oxnard (CA) Community Transition Planning Grant	Jun-95	$140
	Community Transition Assistance	Jan-96	$100
	National Conversion Pilot Project II	Feb-96	$5,000
Subtotal			$20,723
Savannah River	Regional economic planning, assessments and development	Oct-93	$2,600
	Savannah River Regional Diversification Initative	Sep-94	$6,320
	Technology-specific commercialization, planning and support	Feb-95	$4,875
	International Center for Applied Research	Aug-95	$12,000
Subtotal			$25,795

TOTAL FUNDING FOR ALL SITES	$127,764

4/4/96 15 16

WORKER AND COMMUNITY TRANSITION SUPPORT SERVICE CONTRACTORS

Mr. Myers. What program activities are performed by support service contractors?

Mr. DeGrasse. The Office of Worker and Community Transition is responsible for policy in the areas of work force planning and restructuring, community transition, and labor relations. Operating with a small Federal staff, the Office of Worker and Community Transition faces major challenges brought about by the increase in employee layoffs necessitated by the reducing Departmental budget. The principal program activities supported by contractors are in the areas of:

Work Force Planning and Restructuring

- Creation, maintenance and support of a Department-wide Work Force Information System
- Implementation of an integrated work force management approach
- Development of work force planning and restructuring performance measures
- Assessment of best practices in work force planning and restructuring

Community Transition

- Enhancement of community programs by providing an analysis of communities' existing planning and development activities.

General Office Support

- Support of public participation activities to include assistance in planning for workshops, developing public information materials, and maintenance of an electronic bulletin board;
- Administrative support such as briefings and other visuals for presentations; and,
- Development and maintenance of a correspondence file/tracking system

PRIME CONTRACTOR EMPLOYMENT SEPARATIONS

Mr. Myers. Provide a chart showing by site the number of employee reductions in fiscal year 1994, 1995, 1996 and 1997, the costs of the program, and the average cost per employee.

Mr. DeGrasse. Costs associated with any further restructuring at given sites in 1996 or in 1997 would depend on the development of work force restructuring plans that would define the extent and makeup of required restructuring, what benefits would be made available, and an estimate of how many employees would choose to participate in different programs. The Department intends to continue to use an average separation cost of no more than $25,000 per worker as a benchmark for evaluating proposed benefit options.

Approximately 2,400 contractor employees have been separated at other non-defense sites across the Department during 1994-1995. In virtually all cases formal work force restructuring plans have not been developed for these changes and all costs have been borne by affected program budgets. No detailed cost estimate is available for the cost of these separations, although data received to date indicate that average separation costs per worker are below the average identified on this chart.

The number of employee reductions for fiscal year 1994, 1995 and to date in 1996 are shown in a table which I would like to insert for the record. The information follows:

PRIME CONTRACTOR EMPLOYMENT SEPARATIONS UNDER WORK FORCE RESTRUCTURING AT SELECTED SITES, WITH AVERAGE AND TOTAL COSTS

(By Site and Year)

	Employee Separations - Program Costs - Costs per Separations														
	FY 1993			FY 1994			FY 1995			FY 1996 to date			Totals		
Site	Seps.	Cost	Ave. Cost	Seps.	Cost	Ave. Cost	Seps.	Cost	Ave. Cost	Seps.	Cost	Ave. Cost	Seps.	Cost	Ave. Cost
Richland							3 850	$78,925 000	$20 500	358	$5 502 460	$15 370	4,208	$84 427 460	$20 064
Idaho				50	$830,000	$16,600	1,491	$42 120,750	$28 250				1 541	$42 950,750	$27 872
LLNL															
Nevada				1,008	$8,164,800	$8,100	1,128	$8,798,400	$7 800	838	$7 140 000	$8 520	2 974	$24 103 200	$8 105
SNL										356	$8 650 800	$24 300	356	$8 650 800	$24 300
LANL							316	$8,983,880	$28,430	197	$3 900 600	$19,800	513	$12,884 480	$25 116
WIPP															
Rocky Flats	248	$5,084,000	$20,500	807	$16 543 500	$20,500	2,280	$56,863,200	$24,940				3 335	$78 490 700	$23 535
Kansas City	319	$7,528,400	$23,600	881	$20,791,600	$23,600							1 200	$28 320 000	$23 600
Pantex															
Mound	28	$453,600	$16,200	376	$6 091,200	$16,200	186	$3 422 400	$18 400				590	$9 967 200	$16 894
Fernald				254	$6 477 000	$25 500	182	$4 641 000	$25 500	95	$2 451 000	$25 800	531	$13 569 000	$25 554
Savannah River	1,088	$24,567,040	$22,580	796	$17 973 680	$22 580	2,858	$72 879,000	$25 500	504	$3 981 600	$7 900	5 246	$119 401 320	$22 760
Oak Ridge				1 663	$86 293,070	$51 890	103	$1 756 150	$17 050	230	$4 738 000	$20 600	1,996	$92 787 220	$46 487
Pinellas	489	$28,186,900	$60,100	153	$9,229,100	$60,300	330	$20,335 300	$65,800	28	$1 708 000	$61 000	980	$59 459 300	$60 673
Subtotal	2,152	$65,819,840	$30,585	5,988	$172,393,950	$28,790	12,724	$298,725,080	$23,477	2,606	$38,072,460	$14,610	23,470	$575,011,430	$24,500
Community Transition		$625,000			$68,286,000			$40,753,000			$18 100,000			$127 764 000	
Grand Total		$66,444,840			$240,679,950			$339,478,080			$56,172,460			$702,775,430	

Note Aproximately 2402 separations ocurred at other sites (data not available) that are not included in the Total Separations figure

INTERNATIONAL CENTER FOR APPLIED RESEARCH

Mr. Myers. What is the status of funding for the International Center for Applied Research?

Mr. DeGrasse. The Department of Energy has budgeted $12 million in fiscal year 1995 for the International Center for Applied Research (ICAR). Funding for ICAR was drawn from unspent balances available to the Savannah River Operations Office. These funds have been reprogrammed in order to shift funds available in capital equipment and construction accounts where the majority of unspent balances resided. The Department is still seeking an appropriate mechanism for spending the $12 million.

Mr. Myers. By year, how much funding has been provided?

Mr. DeGrasse. No additional funding beyond the $12 million has been provided to support the ICAR project.

Mr. Myers. How may workers have been retrained? What percentage of those who received training found new jobs?

Mr. DeGrasse. A distinction is made in the 3161 program between benefits provided to: 1) retrain workers in order to retain them for continued employment; and 2) provide education assistance for separated workers, which is usually given for career transition purposes.

With regard to retraining for internal placement, through fiscal year 1995 the Department retrained and internally placed within the complex 1,700 workers who otherwise would have been separated.

With regard to educational assistance for separated workers, a survey of workers separated as a result of the fiscal year 1993 and fiscal year 1994 plans was conducted in early 1995. Of those that received educational assistance and completed their programs, 42 percent stated that it was helpful in finding a new job. However, the same survey indicated that 38 percent of those who received educational benefits would take 19 or more months to complete their studies and so could not have answered the question.

Thus, of the approximately 2,300 separated workers who received approval for educational benefits as a result of the FY 1993 and 1994 plans, it may be estimated that nearly all of those taking such benefits by the end of calendar year 1994 - 42 percent or some 960 employees - had completed their education and found it useful in obtaining employment. Another 38 percent - somewhat over 850 employees - would not have completed their education or training at the time of the survey. On this basis, it may be estimated that about 20 percent of those separated and receiving educational assistance either did not find the education useful in obtaining employment, did not take educational assistance for reemployment purposes or did not respond to the question.

TRITIUM

Mr. Knollenberg. Please explain the Department's approach to selecting a new tritium source. How are we assuring ourselves of a reliable source of tritium?

Dr. Reis. The Department completed a extensive review process to select the best method to meet the tritium production requirement. This process is documented in the Programmatic Environmental Impact Statement for Tritium Supply and Recycling, the Technical Reference Report for Tritium Supply and Recycling. This documentation is summarized in the Tritium Supply and Recycling Record of Decision. Chapter VI of the Stockpile Stewardship and Management Plan, which will be submitted to Congress on April 16, 1996, presents how the decision will be implemented.

Mr. Knollenberg. Was the selection based on cost benefit?

Dr. Reis. The Record of Decision referred to above presents the basis for the Departments decision, which includes technical, cost, schedule and environmental considerations.

Mr. Knollenberg. Why was the option to use the Fast Flux Test Facility at Hanford rejected as an option?

Dr. Reis. The Fast Flux Test Facility was considered but eliminated from detailed study in the Programmatic Environmental Impact Statement for Tritium Supply and Recycling. While either of the selected alternatives can produce enough tritium to meet the requirements specified in the 1996 Nuclear Weapons Stockpile Memorandum, the Fast Flux Test Facility cannot. In addition, the Programmatic Environmental Impact Statement concluded that relying on the ability to modify and operate the Fast Flux Test Facility well into the middle of the next century is not a reasonable alternative. We are currently reviewing the basis for our decision and new analyses to determine if the Fast Flux Test Facility should be reconsidered.

DECLASSIFICATION

Mr. Knollenberg. What is the value of accelerating the declassification process? (Why are we doing this?)

Ms. Rohlfing. The primary value associated with accelerating the declassification process is to provide additional information to the public. President Clinton has stressed the importance of an informed electorate in a democratic society. Much of the information retained by the Department contains the historical policy making files and other records that will provide insights into many areas of concern to our private citizens. For example, the Association of Atomic Veterans is very much interested in obtaining information regarding tests in the Pacific to support the claims of the veterans and their survivors. Without damaging national security interests, much of this information may now be releasable.

PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENTS

Mr. Knollenberg. How much have the Stockpile Stewardship and Fissile Materials Programmatic EISs cost to date?

Dr. Reis. The cost for preparation of the Draft Fissile Materials Programmatic EIS (dated February 28, 1996) was about $9 million. The cost of the Stockpile Stewardship Programmatic EIS (dated February 28, 1996) was about $6 million (this includes approximately $2 million that was spent on the project-specific analysis for the National Ignition Facility).

Mr. Knollenberg. What is the expected total cost for each of these studies?

Dr. Reis. The cost for preparing the Final Fissile Materials PEIS (planned date is early November, 1996) is estimated to be about $5 million. The total estimated cost for this document is therefore about $14 million. The cost for preparing the Final Stockpile Stewardship Programmatic EIS (planned date is July, 1996) is estimated to be about $4 million. The total estimated cost for this document (including the project-specific analysis for the National Ignition Facility) is therefore about $10 million.

Mr. Knollenberg. Who completed the PEIS?

Dr. Reis. Tetra-Tech is the contractor responsible for preparation of both PEISs. Authors of the various chapters include staff from the Department of Energy, Tetra-Tech, and its subcontractors.

Mr. Knollenberg. Were external contractors used?

Dr. Reis. Yes. Besides Tetra-Tech, the subcontractors include Halliburton NUS, SRA Technologies, Maxwell S-CUBED, and Lamb Associates.

NUCLEAR WEAPONS TRANSPORTATION CANISTERS

Mr. Bevill. A DOE Inspector General's report from October of 1995 detailed the development and production by DOE of nuclear weapons transportation canisters for the Air Force that the Air Force did not want and ultimately did not accept. The development and production costs were listed by the IG at around $30 million. What have you done to insure that this type of incident is not repeated?

Dr. Reis. The Department initiated Transportation Accident Resistance Containers (TARCs) development and prototype production to meet the projected needs of USAF for overseas and CONUS shipments by air. The potential for the use of TARCs by the USAF required 2 to 3 years lead time for the Department to develop and produce containers. When former President Bush announced the return to the U.S. of many nuclear weapons deployed overseas, DOE believed air transportation for USAF weapons safety would be enhanced by using TARCs on weapons containing conventional high explosives (CHE).

During the late 1970's and 1980's, the Army used TARCs, furnished by DOE, very effectively in shipment of CHE nuclear weapons. Based on this experience with the Army, DOE believed that the USAF would use the TARCs, if available, and chose to err on the side of enhancing the safety of these shipments. Therefore, the DOE was faced with supporting needs it believed the Air Force required and supporting these requirements, potentially, on a very short notice. However, both the Assistant to the Secretary of Defense (Nuclear, Chemical & Biological) (formerly Atomic Energy) and the Secretary of the Air Force issued a policy directive on the use of TARCs for air shipments of nuclear weapons containing conventional high explosives only after the weapons air shipments from overseas were completed. The Air Force, subsequently, has chosen to use DOE highly protective, safe secure trailers to move all conventional high explosive weapons by ground transportation within the U.S.

Mr. Bevill. Please detail how your office has implemented the three recommendations made by the IG in their report.

Dr. Reis. The first recommendation is to obtain a final decision from the DoD on their acceptance and agreement to use containers developed for the Air Force. Until a decision is reached, the Department should not take any action to build or modify containers for the Air Force.

The USAF has decided to transport all nuclear weapons containing conventional high explosive on the road using DOE safe, secure trailers in CONUS. The USAF has no weapons containing conventional high explosives overseas; therefore, USAF need for these TARCs does not exist. The Department has terminated the program to build or modify containers for the Air Force until a firm requirement has been established.

The second recommendation is to take appropriate action to dispose of the accident resistant containers and related equipment if it is found that there is or will not be any future use for them.

The DOE is currently evaluating other potential uses for these containers including the Department emergency management mission. While these evaluations are being completed, the TARCS are now being stored in an underutilized DOE facility with other Defense Programs hardware. The TARCs disposition decision will be made in FY 1997.

The third recommendation is to ensure the implementation of policies and procedures to prevent spending resources on the production of products before the Department and the customer (intended user) agree to the need and the customer agrees to use the product.

We continue to believe that sufficient communication lines, formal as well as informal, exist between DOE and DoD for weapon safety related issues. To satisfy the Department's joint safety responsibility with DoD, we believe that the Department should undertake proactive development and prototype production efforts to enhance weapon safety, and anticipate future requirements for safety enhancements and make them available to the services on a timely schedule for implementation. In this instance of TARCs intended for the USAF, a prudent decision was made to initiate limited TARC production to ensure the USAF could implement weapon safety improvements when needed to enhance public safety. However, we will, to the extent feasible, establish a prior customer requirement before new safety products are manufactured.

Mr. Bevill. What is the total cost, to date, of storage and maintenance of these containers?

Dr. Reis. The United States Army has charged DOE a sum of $11,875 for the total cumulative TARCs storage cost at Sierra Army Depot.

Mr. Bevill. What are the projected yearly costs?

Dr. Reis. The containers are now stored in a DOE storage facility with other Defense Programs hardware, and therefore a specific incremental storage cost that could be attributable to TARCs does not exist. The storage of these containers represents a small fraction of Defense Programs storage area at the facility.

Mr. Bevill. The IG's report indicated that DOE felt confident that current regulations and oversight procedure are adequate to protect against this type of error from reoccurring. If this is true, what happened in this instance - was it totally management error and if so what steps have been taken to make sure that it doesn't happen again?

Dr. Reis. The Department of Energy (DOE) has sufficient coordination and interaction with the DoD staff to avoid recurrence. The DOE Headquarters (HQ) Office of Defense Programs and the Albuquerque Operations Office have various communications channels with the DoD HQ staff and individual military commanders designed to provide weapon safety and operational information directly. The DOE and DoD liaison consists of participation in the following joint organizations: Nuclear Weapons Council (NWC), Nuclear Weapons Council Standing and Safety Committee (NWCSSC), NWC & NWCSSC Action Officer group, and Project Officer Groups (POGs). In addition, DP has assigned DOE staff to the Office of the Assistant to the Secretary of Defense (Nuclear, Chemical & Biological). This individual works daily with DoD staff and the NWC staff addressing issues and serving as an information conduit to the DoD. This staff interaction enhances high level coordination and guidance concerning nuclear weapon safety. Therefore, we do not foresee any compelling need to create additional levels of government bureaucracy in this regard.

In the development of the TARCs, DOE discharged its joint responsibility with DoD for nuclear weapon safety matters, including weapon transportation, pursuant to the Atomic Energy Act, as amended. The Department has a responsibility to conduct research and development programs to develop state-of-the-art technology needed to enhance weapons safety and security. The Department must also anticipate potential needs for safety and security improvements and provide safety enhancement hardware to the military on a timely schedule. In the future, the DOE will assure a requirement and commitment exist before production.

Mr. Bevill. This incident intimates that DOE's safety standards for nuclear weapons transportation are much stricter than those practiced by the Air Force. Do you believe that the Air Force's safety standards for the transportation of nuclear weapons are adequate to protect public safety?

Dr. Reis. Presently, the USAF has opted to transport the weapons containing conventional explosive by ground transport. The DOE and the DoD continue to fullfill their statutory requirements for the safe transport of nuclear weapons.

PANTEX HIGH EXPLOSIVES FUNCTIONS

Mr. Chapman. It is my understanding that the Department is in the process of determining an appropriate configuration for the future weapons complex. For high explosives fabrication, the Department is examining alternatives that would either maintain the mission at Pantex or transfer the mission to the national labs. Does Pantex currently perform all high explosive manufacturing for the Nuclear Weapons Complex?

Dr. Reis. Yes, Pantex is currently and has been manufacturing main charge explosives and components to be incorporated in nuclear weapons in excess of 40 years. Buildings at the Pantex Plant designated for this mission would require virtually no modifications, are modern, and are constructed as explosives manufacturing facilities. The only exception is the plan to renovate a 1980s building to accommodate the formulation activity which is currently residing in a aging facility.

Mr. Chapman. It is also my understanding from the Draft Stockpile Management Environmental Impact Statement that Pantex will continue for the foreseeable future its disassembly and maintenance work, which involves high explosives. Is this correct?

Dr. Reis. Two sites, Pantex and Nevada Test Site, are being evaluated in the SS&M PEIS to perform the assembly/disassembly function. Pantex has been selected by the Secretary of Energy to be the preferred alternative.

Currently, there is no preferred alternative for the HE mission which may stay at Pantex or go to LANL or LLNL or be split between both laboratories. DOE is evaluating these alternatives and expects to have a preferred alternative for the HE fabrication mission by July 1996.

Mr. Chapman. In determining where to locate this activity, I assume you would consider capital, training, and other costs?

Dr. Reis. Capital costs, transition costs, and life cycle costs will be considered in the decision. These costs are analyzed in two documents, "Analysis of Stockpile Management Alternatives," (draft), dated February 1996 and "Stockpile Management Preferred Alternatives Report," (draft) dated February 1996.

Mr. Chapman. How can it be cost-effective to transfer this function to the national labs when the Department is planning for a reduction in workload and the work is already being done at Pantex and will continue to be done there?

Dr. Reis. DOE is concerned about both cost of future operations and the necessity to maintain technical competency in all critical material and manufacturing technologies. For High Explosive fabrication, assigning the mission to both LANL and LLNL, though more expensive, provides greater assurance of maintaining HE competency for all nuclear weapons missions. DOE is currently assessing these important, but in this case conflicting, objectives before making a final site selection.

For the HE fabrication mission, any of the three sites (Pantex, LANL, and LLNL) have the capability to carry out the activities. Capital and transition costs would be approximately $25 M for LANL, $28 M for LLNL, and $32 M for the alternative that would establish HE production shared between LANL and LLNL. The capital costs of downsizing the HE mission at Pantex would be $11 M. Operating costs over 30 years would be between $30 M and $60 M for each of the individual site alternatives, but would be $84 M for the split LANL/LLNL alternative.

Mr. Chapman. Wouldn't you be recreating, at a significant cost to taxpayers, a function that already exists at Pantex? For example, I understand the incremental costs of performing this work at Pantex would be $3 million and 51 employees. At Los Alamos National Lab it would be $6 million and 65 new jobs and at Lawrence Livermore it would be $8 million and 150 new jobs.

Dr. Reis. While any of the three sites (Pantex, LANL, and LLNL) have existing facilities for carrying out the high explosives fabrication mission, based on the cost data we have developed to date, it is true that transferring the high explosives fabrication mission to either LANL or LLNL, or shared between LANL and LLNL, would be slightly more costly than downsizing the high explosive fabrication facilities at Pantex. Capital and transition costs associated with transferring the mission range between $25 M - $32 M, compared to the $11 M for downsizing the Pantex facilities. Operating costs over 30 years would not vary significantly among the individual site alternatives, but would be greatest for the LANL and LLNL alternative that would share the high explosives fabrication mission. Against these cost considerations, we are weighing the issue of how to best assure high explosives competency for the nuclear weapons complex.

PANTEX BUDGET AND AMARILLO NATIONAL RESOURCE CENTER FOR PLUTONIUM

Mr. Chapman. Your plans for Pantex in FY97 includes disassembly of about 2,000 warheads. Is that correct?

Dr. Reis. In FY 1997, Defense Programs will continue dismantlement activities with the objective of dismantling 1,221 nuclear weapons.

Mr. Chapman. Is this a change from prior years?

Dr. Reis. Yes, it is. Previous plans had been to achieve and sustain an annual dismantlement rate of 2,000 until the backlog of retired weapons was worked off. The previous goal of 2,000 dismantlements per year was reduced to reflect weapon-specific needs, operational experiences, and safety considerations. The revised plan eliminates the backlog of retired weapons by FY 1999 and supports the DOD activities.

Mr. Chapman. It is my understanding that Pantex requested $282 million for FY 97 assuming a workload of 2,000 disassembled weapons, however, a budget of $265 million was approved. With the decreased funding requested, will there be a corresponding reduction in workload?

Dr. Reis. As I previously discussed, the FY 1997 dismantlement goal has been set at 1,221. The $265 million level request for FY 1997 will support that level of dismantlements.

Mr. Chapman. What will suffer as a result of the decreased funding?

Dr. Reis. Nothing will suffer. The request is sufficient to support the planned workload.

Mr. Chapman. Is there a possibility the plant capabilities, including safety, will be adversely affected?

Dr. Reis. The proposed budget for Pantex will support the completion of the workload and also maintain the safety, security, and environmental standards that have been achieved at the plant. Risk could always be reduced with the application of additional resources, but the marginal benefits to be obtained must be weighed against the additional cost incurred.

Mr. Chapman. Does the funding for the Amarillo National Resource Center for Plutonium in any way affect the funding for Pantex?

Dr. Reis. Funding of $5 million from Defense Programs and $5 million from the Materials Disposition program for the National Resource Center for Plutonium is included in the FY 1997 DOE budget. This additional requirement was taken into consideration when establishing the overall allocation.

Mr. Chapman. Concerns have been expressed to me that the funding for Pantex is reduced by the funding allocated to the Center. Since they are two separate organizations with different missions, what is the rationale for that decision?

Dr. Reis. While the Department has committed to continued support for the Center, there has been no separate funding source identified for that purpose subsequent to FY 1996. In order to maintain operation of the Center, money was allocated by Defense Programs from the Stockpile Management budget, but not as a reduction to Pantex Plant funding.

PANTEX BUDGET

Mr. Thornberry. In FY96, the Department of Energy requested a weapons activities budget for Pantex of $240 million. The actual budget has since been reduced to $235.8 million. The weapons activities mission requirements for Pantex during FY97 and FY98 increase, such as continued dismantlement and new enhanced surveillance activities, yet projected budget numbers are much lower ($17 million short in FY97 and $28 million in FY98). Is this correct?

Dr. Reis. You are correct that the Department's FY 1996 Congressional Budget Request for Weapons Activities for the Pantex Plant was $240 million.

Mr. Thornberry. Please explain the difference?

Dr. Reis. This amount was subsequently reduced by $4.2 million to $235.8 million reflecting Pantex's portion of $37.2 million in savings from contractor streamlining enacted in the FY 1996 Energy and Water Development Appropriations Bill. The same workload will be done at a lower cost because of improved efficiencies. The FY 1996 Energy and Water Bill also provided a one time increase of $106 million for maintaining infrastructure, capabilities, and enhanced surveillance. The Pantex allocation of the $106 million is $17 million for a final FY 1996 budget of $252.8 million. The FY 1997 request for Pantex is $244 million which is considered appropriate for the projected workload level. Since the Department's FY 1998 budget cycle is just beginning there is no known funding shortfall of $28 million in FY 1998 for Pantex.

Mr. Thornberry. Please provide detailed budget justifications on how the FY 97 funding level was determined and how this level of funding compares to the FY 96 funding level.

Dr. Reis. The original FY 1997 request from the Plant for operating expense was $248 million. Adjustments were made for enhanced surveillance (+$2.880 million) and improved efficiencies from contractor streamlining consistent with the FY 1996 Energy and Water Development Appropriations Bill and an allocated share of a general reduction imposed against the Stockpile Management program ($6.9 million). This results in a net request of $265 million for FY 1997, compared to a "base" budget of $235.8 million for FY 1996. The "base" budget for FY 1996 has subsequently been increased by $17 million, the Pantex allocation of the $106 million Congressional add-on. The FY 1997 request for Pantex is $265 million, which is considered appropriate for the projected workload level.

Mr. Thornberry. Please provide a detailed comparison of what the mission and workload requirements are at Pantex for both FY 96 and FY 97.

Dr. Reis The workload and mission for the Pantex Plant remain essentially constant between FY 96 and FY 97. A table showing the approximations of the quantities of units to be processed for each of the weapons functions is shown in a table which I would like to insert in the record. The information follows:

PANTEX PLANT WORKLOAD COMPARISON

	FY 1996	FY 1997
Dismantlement	1,164 *	1,221
Evaluation	350	390
Maintenance	80	150
Reservoir Shipments (H616)	1,920	640
AT-400 Repackaging	125	800
Other	270	270
Total Units	3,909	3,471

* The FY 1996 budget assumed a workload requirement of 2,000 dismantlements. Savings that result from the reduced workload will be applied to FY 1997.

Mr. Thornberry. Will your requested FY 97 level of funding effectively require lay-offs at the Pantex Plant in FY 97?

Dr. Reis. No lay-offs are anticipated at this time.

GENERAL

Mr. Thornberry. I remain very concerned as to whether the Department of Energy (DOE) is adequately preserving and maintaining our nation's competency and capability to remanufacture nuclear weapons. I am concerned that the DOE has comprised the country's component manufacturing capabilities as a result of previous decisions by DOE to consolidate manufacturing functions into the design laboratories. The National Defense Authorization Act of 1994 (103-160) requires the core technical competencies of the U.S. in nuclear weapons must be maintained, particularly in manufacturing and surveillance capabilities (among other things). Have we done this?

Dr. Reis. The Department is maintaining the core competencies of U.S. nuclear weapons in several ways. Preferred alternatives have been announced resulting from the publication of a Draft Stockpile Stewardship and Management Programmatic Environmental Impact Statement, a study reconsidering the size and configuration of the nuclear weapons complex. The Department, in cooperation with the Department of Defense, has developed a plan detailing goals, objectives, and milestones. This classified Stockpile Stewardship and Management Plan will be provided to Congress on April 16, 1996. In addition, the Department continues to implement Nonnuclear Reconfiguration of the complex. Finally, there are several new initiatives underway or planned including Enhanced Surveillance and Advanced Design and Production Technologies (ADaPT) representing a new approach to meeting the responsibilities of future nuclear weapon production and management.

Mr. Thornberry. I believe a number of areas need to be examined, including the following: What are the pit manufacturing limitations the DOE has suffered due to the shutdown of the Rocky Flats Plant and the transfer of that function to the Los Alamos National Lab (LANL)?

Dr. Reis. Since the closure of Rocky Flats, the pit surveillance mission and associated technology and records have been relocated to Los Alamos to support continued stockpile safety and reliability. A capability to rebuild pits consumed in surveillance testing will be operational within the next two years.

Mr. Thornberry. What are the neutron generator manufacturing limitations the DOE has suffered due to the shutdown of the Pinellas Plant and the transfer of those functions to the Sandia National Laboratory (SNL)?

Dr. Reis. Prior to the shutdown of Pinellas, the DOE pre-built enough neutron generators to cover the time period needed to reestablish the manufacturing capabilities at SNL; therefore, there have been no impacts to deliveries of neutron generators. Furthermore, SNL has met their requirement to assemble and recertify parts for W76 neutron generators beginning in April 1995.

Mr. Thornberry. What are the main charge detonator manufacturing limitations the DOE has suffered due to the shutdown of the Mound Plant and the transfer of those functions to LANL?

Dr . Reis. DOE has not suffered any manufacturing limitations in main charge detonators. Detonators were pre-built at Mound prior to its shutdown and LANL is currently establishing the capability and capacity necessary to meet stockpile requirements.

Mr. Thornberry. What was the impact and result of transferring microelectronics manufacturing work from the Kansas City Plant (KCP) to SNL?

Dr. Reis. There has been no transfer of microelectronics manufacturing work from KCP to SNL. SNL is currently procuring microelectronics from the private sector that were once procured by KCP. There have been no impacts to delivery schedules due to this change.

Mr. Thornberry. What would be the impact on DOE's high explosives manufacturing capacity and capability if these functions were transferred from the Pantex Plant to LANL and Lawrence Livermore Laboratory (LLNL)? Would this move be cost-effective?

Dr. Reis. There would be no impact to the DOE's ability to manufacture high explosive components if that mission was transferred to the national laboratories. Both laboratories have significant capabilities through their high explosives RD&T missions. Joint assignment of the high explosive production mission to the two laboratories is more expensive than assignment to any of the three sites alone. However, the two-laboratory alternative best preserves core competency in high explosives, a critical stockpile stewardship capability. The Department has deferred identification of a preferred alternative for the high explosive production mission until all relevant environment, cost, technical, and programmatic evaluations have been completed late this summer.

Mr. Thornberry. In the cases where the production lines have been transferred, have the Labs produced those components to the same standards and quantities as the production plants historically had?

Dr. Reis. All war reserve components must meet design specification and be manufactured in accordance with DOE's Quality Control Standard, QC-1, regardless of the site responsible for production. As stated earlier, SNL has already delivered neutron generators that meet these quality requirements.

Mr. Thornberry. What was the average cost in 1993 of a man-year of effort at LANL, LLNL, SNL, Kansas City, Y-12 Sites and the Pantex Plant.

Dr. Reis. I would like to insert in the record the average employment costs in 1993 of a man-year effort for the sites in question. The information follows:

Laboratory/Site	**Direct**	**Total (including Overhead)**
Los Alamos National Laboratory	$ 57K	$136K
Lawrence Livermore National Laboratory	$ 76K	$112K
Sandia National Laboratory	$ 70K	$143K
Kansas City Plant	$ 52K	$ 75K
Y-12 Site	$ 52K	$ 69K
Pantex Plant	$ 54K	$ 79K

GENERAL

Mr. Thornberry. The Draft SSM PEIS states "comparable facilities also exist at both LLNL and LANL, and either laboratory has sufficient capacity to meet estimated future manufacturing requirements." Does Pantex not have the most modern HE manufacturing facilities in the complex?

Dr. Reis. The high explosive facilities at Pantex were built during the 1980's, and are newer than the Los Alamos or Livermore facilities. The equipment in all three facilities was procured at about the same time (sometimes on the same purchase order).

Mr. Thornberry. Is Pantex not the most economical site to perform the high explosive mission? For example, I understand the incremental costs of performing the HE work at Pantex would be $3 million dollars and involve 51 employees. At LANL the incremental cost would be $6 million and involve 65 new direct employees. LLNL would involve an incremental cost of $8 million and would require 100 new direct jobs and 150 new indirect jobs.

Dr. Reis. As discussed in the draft Stockpile Management Preferred Alternatives Report, which has been inserted in the record, the cost to perform the high explosive mission is about the same for any of the three sites. Assigning the mission to both Los Alamos and Livermore would be the highest cost alternative, however.

Mr. Thornberry. How does moving HE work to both LANL and LLNL square with "downsizing" and "reducing costs?"

Dr. Reis. In addition to costs, which for high explosives are relatively low for all alternatives, the DOE must also assure continued high explosive competence to support both its stockpile management and stockpile stewardship missions. The amount of future high explosive fabrication work for both stewardship and management is very low compared to historical levels. It is so low that DOE is concerned about continued competency maintenance. For these reasons, DOE is continuing to address the high explosive fabrication mission, and has not as yet selected a preferred alternative.

Mr. Thornberry. Can LLNL and LANL perform at the same high level of expertise and with the same level of facilities the role traditionally played at Pantex in high explosive procurement, evaluation, acceptance, fabrication, and assembly at many sizes and types and different levels of specifications?

Dr. Reis. The equipment and capabilities for high explosive fabrication at Pantex, Los Alamos, and Livermore are essentially identical. Pantex has greater experience in fabricating high explosive components to meet production quality standards, however both laboratories have routinely fabricated high explosive parts in the past for the underground nuclear test program and the above ground hydrodynamic test activities. Capabilities of all three sites are sufficient to meet future requirements.

Mr. Thornberry. Since you propose keeping the assembly/disassembly operations at Pantex, why would you propose moving HE fabrication elsewhere, thus creating the new problems of transporting hazardous materials (armed explosive assemblies) repeatedly cross country?

Dr. Reis. Armed high explosive assemblies would not be transported. Machined high explosive parts, without detonators, would be shipped from Los Alamos or Livermore for assembly with detonators into weapons at Pantex under the laboratory alternatives.

Mr. Thornberry. Would it not make more sense to manufacture the high explosive assemblies at Pantex and transport them only within the confines of the plant?

Dr. Reis. Transportation of these high explosives would meet all Department of Transportation safety requirements, much as the shipment of high explosives to and from Pantex today is done.

Mr. Thornberry. Explain, in as much detail as possible, how high explosive technical competence can be maintained at the weapons laboratories only if a production mission is assigned?

Dr. Reis. This subject is discussed in greater detail in the draft Stockpile Management Preferred Alternatives Report. However, the issue of maintenance of technical competence, for both development and production, is an issue that the Department of Energy is seeking to assure for all portions of the weapons complex. I would like to insert in the record, the pertinent pages from the Stockpile Management Preferred Alternatives Report. The information follows:

4. Capacity Assumptions and Contingency Options

As with plutonium pit production workload, the projected workload for secondary fabrication, after near term planned work is accomplished, is projected to be mainly that associated with the replacement of secondaries destroyed during routine surveillance testing. However, unlike pits, secondaries contain organic compounds which can deteriorate with age. The capability to fabricate all secondary and case parts provides an inherent capacity to produce up to 50 sets of weapon components per year. This capacity is sufficient for either the low case or the base case stockpile levels. For the high case stockpile, a factory with a single shift capacity of 100 units per year was assessed. The added investment cost for the higher capacity ranged from $5 million at LANL or Y-12 to $70 million at LLNL. Because of this relatively small required investment for a relatively large contingency capacity, an operational single shift capacity of 100 secondaries per year is assumed to be maintained. At Y-12, an added single shift capacity of 200 secondaries per year can be maintained in a standby mode at minimal cost. This option adds to the attractiveness of the Y-12 alternative. Multiple shift operations would add to these capacity levels.

C. High Explosives Mission

1. Preferred Alternative for High Explosive Production

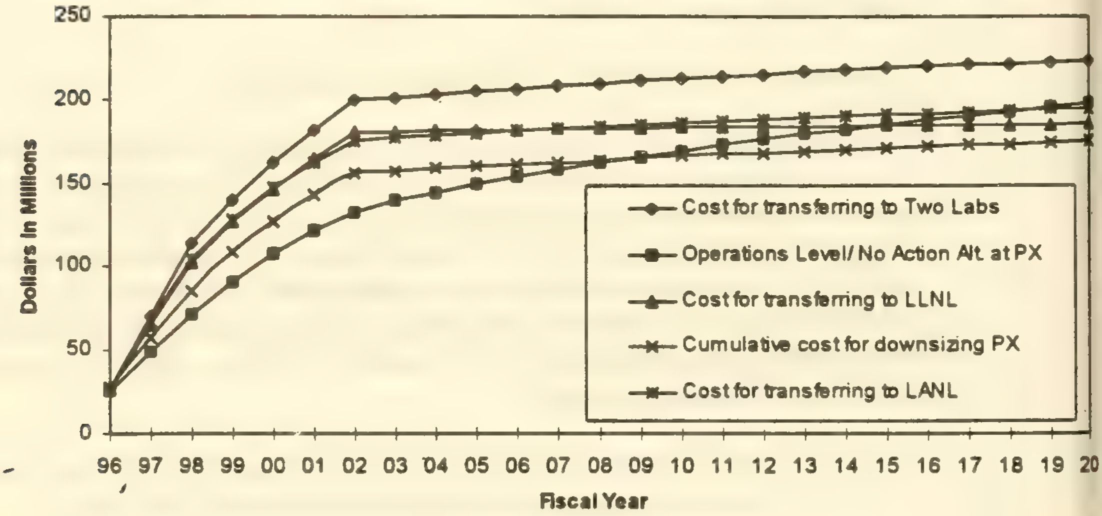
The High Explosives (HE) production mission includes HE procurement, formulation, component fabrication, characterization, surveillance, disposal, and storage. Three sites were considered for the HE production mission: to transfer the work to Los Alamos National Laboratory (LANL) and/or Lawrence Livermore Laboratory (LLNL), or to retain the mission at a downsized Pantex. These three sites have fully capable existing HE capabilities. DOE seeks to assure core competency maintenance while achieving cost efficiencies. The alternative which best achieves these objectives is not clear at this time, therefore,

DOE has deferred identification of a preferred alternative for the high explosives production mission while further analyses are performed.

As discussed in the following sections, this assignment will not be made solely on the basis of cost. The costs for HE production are relatively small for all alternatives, though the joint assignment to the two laboratories is more expensive than assignment to any of the three sites alone. However, the two-laboratory alternative best preserves DOE core competency in high explosives, a critical stockpile stewardship capability. Sections IV and V describe the technical, cost, and schedule implications for LANL and LLNL assuming they have been jointly assigned the HE production mission. Section VIII provides corresponding information assuming the mission has been assigned to a downsized Pantex. A preferred alternative determination between these two alternatives will be made prior to publication of the final SSM PEIS.

2. Net Present Value Costs

Net Present Value (NPV) costs comprised of one-time transition costs and additional annual operating costs are shown below. Pantex costs assume a base mission to perform weapon assembly and disassembly with the high explosives costs incremental to this base mission. Likewise the LANL and LLNL annual operating costs assume a base program to accomplish weapons research and development. Because of the important contribution that HE fabrication capability provides to Stockpile Stewardship competence at the nuclear weapon laboratories, an alternative was also considered which would assign production responsibility jointly to both laboratories. After relocation or downsizing of the HE capability, the incremental annual operating costs for all alternatives, including the two-lab alternative, are about the same. The cost difference between alternatives is due to transition costs, i.e. facility shutdown, workforce restructuring, and production requalification. These costs range from a low of about $10 million for the Pantex alternative to about $40 million for the two-lab alternative.



HE Fabrication Cumulative NPV Costs for Base Case Workload

3. Technical Risks

All technologies required for the HE mission have been previously demonstrated at LANL and LLNL. Both have in the recent past produced HE components in numbers greater than and at specifications comparable to those required for future production. No deviations from the current baseline technologies used at Pantex would be required. Approved procedures are in place for transporting HE from the laboratory to the assembly site. Therefore, the technical risk is low for either laboratory.

However, both laboratories require significant effort to establish the production support infrastructure needed to sustain production. This is a limitation that DOE has successfully addressed in the past at the weapon laboratories, however. In addition, LANL is currently establishing a production infrastructure for the manufacture of detonators and other assigned weapon components, and LLNL has had a limited production infrastructure in place in the recent past.

The technical risk of consolidating at Pantex would be low. Facilities and equipment are modern, well maintained, and capable.

The following table provides the technical risks and relative cost ranking for each alternative.

Ranking Criteria	Score			
	Pantex	LANL	LLNL	Two-Lab
Capability of Process Technologies	100	96	92	94
Capability of Production Support Infrastructure	100	70	65	68
Minimize Cost	100	100	100	77

4. Capacity Assumptions and Contingency Options

Because high explosives contain organic compounds that decompose with age, high explosive replacement is expected to be required for stockpile weapons as they age. This replacement will require the weapon to be returned to the weapon assembly site for refurbishment. The assumed production capacities for HE components for the low case stockpile was 50 sets per year, for the base case was 150 sets per year, and for the high case was 300 sets per year. The transition costs as well as the annual operating costs were found to be relatively insensitive to these alternative capacities. Therefore, to assure adequate contingency capacity, single shift production capacity of about 300 component sets per year is planned. LANL and LLNL would each have sufficient capacity within existing facilities to support this production rate. Pantex facilities would be downsized to this lower operating capacity. In addition, as a contingency, DOE could retain some existing high explosive buildings at Pantex in a safe shutdown mode at minimal costs under any alternative. These facilities could be reactivated should future requirements exceed established capacities.

5. Other Considerations

DOE has sought to address the level of expected future production requirements, and whether this level of work is sufficient to maintain competence. This issue is particularly appropriate to high explosive fabrication since DOE has three large existing capabilities (at LLNL, LANL, and Pantex), and the future demand for fabrication for both development and production is very small. Maintaining competence at three separate facilities with a small combined workload challenges DOE in maintaining competence for both Stockpile Management and Stockpile

Stewardship. For example, weapon stockpile reductions with no new weapons production have resulted in a ten fold decrease in expected future high explosive production levels compared to historical production levels at Pantex.

This issue is not unique to DOE. In the past, the Department of Defense (DOD) and other federal agencies bought products and services from DOE high explosive facilities to meet unique program needs. This work could contribute to DOE competency maintenance if it were to continue at historical levels. However, major reductions in requirements for energetic material research, development, test, and production are also occurring at DOD laboratories and at industrial research and development facilities throughout the U.S. This decreasing workload presents a severe challenge to the maintenance of essential capabilities and the retention of critical core competencies in energetic materials research, development, and production.

The DOE sought future weapon complex configurations that simultaneously maintained technical competence, minimized technical risk, and minimized costs. It was recognized that in some cases these would be competing objectives where the minimum risk alternative might not be the minimum cost alternative. In the case of high explosive fabrication, downsizing operations at Pantex or relocation to one of the weapon laboratories would be the low cost alternative. However, concerns about potential loss of competency in high explosives at one or both of the laboratories may make the low cost alternative a higher risk alternative.

Due to all of these considerations, DOE has decided to defer the decision for the preferred alternative for the high explosives mission until further analyses can be performed.

D. Nonnuclear Mission

1. Preferred Alternative for Nonnuclear Component Fabrication

There were two alternatives considered for the nonnuclear manufacturing mission as it currently exists at the Kansas City Plant (KCP). One involves downsizing the existing KCP and the other involves transferring the production responsibility to the laboratories which have design responsibility for the products manufactured at KCP (Sandia, LANL, and LLNL). The laboratory alternative had four options (listed in the analysis as Lab A, Lab B, Lab C, and Lab D) to be evaluated. These four options involved various combinations of production assignment to the three laboratories. The reader is referred to the previously referenced *Analysis of Stockpile Management Alternatives* for a detailed description of each laboratory alternative. For reasons of cost and technical risk,

The recommended preferred alternative is to retain the nonnuclear production mission at the Kansas City Plant.

Mr. Thornberry. How have LANL and LLNL maintained their technical competencies to date without a production mission?

Dr. Reis. Both LANL and LLNL maintain research, development, testing, and fabrication capabilities for HE. Both labs have existing capacity to support the projected future workload, and no significant upgrades at either lab are anticipated to receive the mission for HE fabrication for the complex. The labs provide prototype HE components to meet hydrodynamic and Nevada Test Site program requirements, as well as continually analyzing potential improvements to HE and surveillance data. The processing facilities at LANL were built for production-scale operations and were operated as production facilities for many years. Typically, LANL fabricates an average of 1200 to 1500 HE parts per year.

Mr. Thornberry. If HE manufacturing activities are moved to LANL and LLNL, what are your best estimates of the cost involved in recreating the state-of-the-art facilities at Pantex?

Dr. Reis. The costs and schedules for each alternative considered for the high explosive (HE) fabrication mission are also provided in the pertinent pages from the draft Stockpile Management Preferred Alternatives Report, which have been inserted in the record.

Mr. Thornberry. What would be the transition cost over the next 5 years associated with moving and establishing the HE production capabilities at each of the labs?

Dr. Reis. Capital and transition costs would be approximately $25 million for Los Alamos National Laboratory (LANL), $28 million for Lawrence Livermore National Laboratory (LLNL), and $32 million for the alternative that would establish HE production shared between LANL and LLNL.

Mr. Thornberry. What would be the 10-30 year capital cost of such a decision?

Dr. Reis. Operating costs over 30 years would be: $60 million for LANL, $30 million for LLNL, and $84 million for the LANL and LLNL alternative.

Mr. Thornberry. How do these costs compare to the costs of right-sizing the Pantex facility?

Dr. Reis. The costs of downsizing the HE mission at Pantex would be $11 million in capital costs, and $60 million for the 30 years of operation.

Mr. Thornberry. Could not both LANL and LLNL maintain their respective capabilities on site and in conjunction with centralized HE production operations at Pantex and its state-of-the-art facilities, equipment and processes.

Dr. Reis. This is part of the question the Department of Energy (DOE) is continuing to address. DOE believes that it is essential to maintain high explosive competence at both Los Alamos and Lawrence Livermore National Laboratories to assure stewardship of the stockpile's safety and reliability. At the same time, DOE must maintain a relatively small production capacity to meet ongoing weapon refurbishment activities. Today all three facilities and capabilities are very large and under-utilized.

FY 1997 BUDGET REQUEST TO THE CONGRESS

Defense Nuclear Facilities Safety Board

March 1996

John T. Conway, Chairman
A.J. Eggenberger, Vice Chairman
John W. Crawford, Jr.
Joseph J. DiNunno
Herbert John Cecil Kouts

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004
(202) 208-6400

March 15, 1996

The Honorable John T. Myers
Chairman
Subcommittee on Energy and Water Development
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

For FY 1997, the Defense Nuclear Facilities Safety Board (Board) requests $17,000,000 in new budget authority. Due to continuing Federal budget constraints, the Board has limited its FY 1997 request for new budget authority to $17,000,000, equal to the FY 1996 appropriation for the Board.

The Board is an independent Federal agency chartered to perform an oversight role on the health and safety issues associated with the Department of Energy's (DOE) defense nuclear complex. The Board has assembled a talented staff with extensive experience in nuclear-chemical processing, conduct of operations, general nuclear safety analysis, conventional explosive technology and safety, nuclear weapons safety, storage of nuclear materials and criticality safety, and waste management and environmental restoration. Two full-time site representatives are stationed at the Pantex site to oversee the safe assembly and disassembly of nuclear weapons. Two site representatives are assigned to the Hanford site to monitor waste characterization and stabilization, and two full-time site representatives are stationed at the Rocky Flats Environmental Technology Site to monitor DOE's stabilization and storage of the large plutonium inventory at the site.

During the past six years of operation, the Board has advised the Secretary of Energy and other senior DOE officials on a wide variety of specific health and safety matters within the DOE weapons complex. Thirty-three formal Board Recommendations, consisting of 147 individual recommendations, have been made to the Secretary of Energy concerning actions necessary to protect public health and safety. The first 32 sets of recommendations were accepted by the Secretary of Energy. The Board's most recent Recommendation 95-2 entitled "Safety Management" was submitted to DOE on October 11, 1995. On January 17, 1996, the Secretary advised the Board she had accepted the recommendation in part. The Board is currently exploring with DOE the provisions in the recommendation that the Secretary did not accept for further resolution.

To fulfill its primary health and safety oversight mission, the Board will need to maintain its expertise and staffing in areas related to DOE's stewardship and management of the U.S. nuclear weapons stockpile. These areas include: weapon dismantlement, modification, repair, and surveillance at the Pantex Plant; stockpile-related nuclear research and development activities at the DOE weapons laboratories; development of a new DOE weapons tritium source; nuclear experiments and test readiness activities at the Nevada Test Site (NTS); and stockpile dismantlement and life extension activities involving highly enriched uranium at the Oak Ridge Y-12 Plant. Implementation of recent enhancements to the standards-based safety management of nuclear explosive operations at Pantex and NTS, and tailoring of integrated safety management systems at the weapons laboratories, in particular, will require significant Board oversight throughout FY 1997.

The continuing national commitment to dismantle approximately 2,000 nuclear weapons per year has challenged and will continue to challenge the DOE weapons complex, which is experiencing a concurrent erosion of experienced technical capability and limitation in physical plant capacity. The Board must continue to pay close attention to the safety of dismantlement activities, and to those activities needed to meet the requirements of the enduring stockpile, so as to ensure that an appropriate risk management strategy is applied to meeting national security commitments.

DOE's "Stockpile Stewardship" efforts will involve nuclear research and experimental activities at the weapons laboratories and at NTS. The Board is working with DOE and the weapons laboratories to tailor integrated safety management strategies for these types of activities. The initiation of "sub-critical experiments" at NTS in FY 1996, to continue throughout FY 1997 and beyond, will require additional Board oversight resources. In addition, full implementation of integrated safety management systems for research activities at the weapons laboratories is proceeding slowly and is anticipated to require continuing Board attention throughout FY 1997.

During the next several years, the Board anticipates that the ongoing transition of the mission of DOE's weapons complex will continue to evolve, as the legacies of aging facilities, widespread contamination and highly toxic and radioactive waste products and residues from half a century of nuclear weapons production must be dealt with safely. For example:

- As a facility is deactivated and decommissioned, the workers are most often subjected to more hazardous conditions than during operation. The workers will come into closer contact with radioactive materials, enter portions of facilities that were not intended to be occupied and will face other unexpected hazards. Protective measures must carefully be chosen to minimize such effects.

- The aging and degradation of equipment that is at or beyond the end of its design life will present increasing hazards as safety systems become unreliable and break down more frequently.

- Highly radioactive, corroding spent fuel is stored in basins that were not intended for long-term storage. The associated hazards will continue to increase until corrective actions are taken.

- Throughout the complex, acidic solutions of fissile materials are being stored in tanks, bottles and process lines. The longer these materials are stored in such state, the greater the likelihood there could be an accident caused by chemical changes in the solutions, natural phenomena hazards, personnel error or deterioration of containers.

These are among the problem areas the Board has been addressing. As DOE realigns itself to accommodate mandated downsizing and responds to pressures to more rigidly comply with environmental, safety and health requirements, the role of competent, independent, external oversight will become even more demanding. Based on its experience during the past six years, the Board believes that its oversight function is a cost-effective way to provide external oversight of DOE's program to deal with the myriad health and safety issues at defense nuclear facilities. At a public hearing held by the Board on December 6, 1994, the Secretary of Energy provided the following comment on the importance of the Board's independent public health and safety oversight mission:

> "I want to focus, first of all, on your key question, which might be whether the Board has assisted the Department of Energy in identifying significant nuclear safety problems and helped us in correcting those problems. My response would be a resounding yes."

Within this broad context of external environmental, safety and health oversight, success or failure of the Board's independent oversight is best measured in terms of the added assurance of public and worker health and safety gained by having an independent technical group assisting the DOE and its contractors in finding and resolving safety issues throughout the nuclear weapons complex. Given the hazardous aspects of so many of the activities involved in the DOE weapons complex, the effectiveness of the Board's independent safety oversight is perhaps best demonstrated by the numerous advisories and recommendations that the Board has brought to DOE's attention, and the Secretary of Energy has accepted and implemented in the interest of improved environmental, safety and health protection. The Board's contributions to health and safety throughout the DOE weapons complex have been documented in its Annual Reports to the Congress.

The cost and benefits to the taxpayers of the Board's independent technical oversight must also be considered. A major accident during the assembly or disassembly of nuclear weapons would have a serious military, economic, and political impact on the United States, with an accompanying effective impact in the billions of dollars. Considering the serious health and safety problems affecting DOE operations in this area, and the potentially significant economic and health costs of a nuclear accident in a defense nuclear facility, a Federal commitment of $17 million in FY 1997 to support the Board's oversight operations is a small price.

The DOE is considering the possibility of transferring to external regulatory authorities certain self-policing powers for assuring nuclear safety under provisions of the Atomic Energy Act. The Board has been identified in a special study commissioned by DOE as a candidate agency for assuming a regulatory role still to be defined. If the Administration and the Congress consider and enact changes in the Board's existing statutory framework, the Board's budget request will have to be adjusted accordingly, the amount being a function of the specifics of such changes.

In summary, the Board is an independent technical organization with public health and safety oversight responsibility over the DOE defense nuclear operations. As thousands of nuclear weapons are dismantled and sites and facilities are being shut down throughout the complex, important and more complex safety issues have arisen. While progress has been made by DOE in restructuring and implementing an improved internal safety management program, further improvements are needed. Solid internal environmental, safety and health management programs are necessary. This heightens the need for external oversight to ensure public health and safety. The Board, with its current "action-forcing" rather than formal regulatory authority, provides a cost-effective organizational arrangement for achieving the added safety assurance that Congress, the Administration, and the public seek. Our budget request of $17,000,000 should provide the funding needed to support the Board's health and safety review effort required for FY 1997.

The Board welcomes the opportunity to meet and discuss the merits of our budget request with you.

Sincerely,

John T. Conway

John T. Conway
Chairman

Enclosure: FY 1997 Congressional
Budget Request

FY 1997
BUDGET REQUEST TO THE CONGRESS

Defense Nuclear Facilities Safety Board

March 1996

Defense Nuclear Facilities
Safety Board
FY 1997 Congressional Budget Request

PROPOSED APPROPRIATION LANGUAGE

Salaries and Expenses

For necessary expenses of the Defense Nuclear Facilities Safety Board in carrying out activities authorized by the Atomic Energy Act of 1954, as amended by Public Law 100-456, section 1441 $17,000,000, to remain available until expended *(Energy and Water Development Appropriations Act, 1996.)*

Defense Nuclear Facilities
Safety Board
FY 1997 Congressional Budget Request

ANALYSIS OF RESOURCES

(Tabular dollars in thousands).

OPERATING EXPENSES

	FY 1995 (Actual)	FY 1996 (Estimated)	BUDGET REQUEST FOR FY 1997
New Budget Authority	17,865 1/	17,000	17,000
Obligations	17,710	18,209	17,564
Outlays	15,999	18,000	17,600

Authorization: National Defense Authorization Act, Fiscal Year 1989 (amended the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) by adding new Chapter 21 -- Defense Nuclear Facilities Safety Board.

1/ Appropriations reduced from $17,933,000 to $17,865,000 ($68,000) due to FY 1995 rescission in Federal administrative and travel expenses (Section 2007 of H.R. 1944).

Defense Nuclear Facilities
Safety Board
FY 1997 Congressional Budget Request

PERSONNEL SUMMARY

	FY 1995 ACTUAL	FY 1996 BUDGET PLAN	FY 1997 BUDGET REQUEST
Statutory Personnel Ceiling: (FTE's) 1/	150	150	150
FTE Ceiling as reflected in the President's Budget Requests	100	149	146
FTE Usage 2/	105	112	112
Board Members & Permanent Employees at End Of Fiscal Year 1/	104	112	112

1/ National Defense Authorization Act for FY 1992 and FY 1993, P.L. 102-190, raised the Board's statutory employee ceiling from 100 to 150 full-time staff. This statutory employment ceiling does not include Board Members, who are excluded by the Board's enabling legislation from the 150 full-time employees authorized to be hired by the Board. *See* 42 U.S.C. § 2286(b) and 42 U.S.C. § 2286b(b) (as amended).

2/ Includes 5 full-time Board Members.

SECTION I -- PROGRAM OVERVIEW

INTRODUCTION

The Defense Nuclear Facilities Safety Board (Board) was established by Congress in 1988 as an independent oversight body within the Executive Branch. The Board's principal function is to provide advice and recommendations to the Secretary of Energy on public health and safety issues at the U.S. Department of Energy's (DOE) defense nuclear facilities. The Board is the only independent, technical organization, external to DOE, with oversight responsibility for the safety of DOE defense nuclear operations. As required by its enabling statute, the Board has five Members, all of whom "are respected experts in the field of nuclear safety with a demonstrated competence and knowledge relevant to the independent investigative and oversight functions of the Board."

The Board reviews a wide range of safety-related activities throughout the entire life cycle of DOE's defense nuclear facilities, and makes recommendations to the Secretary of Energy that the Board deems necessary to protect public and worker health and safety. The Board also assesses safety management and personnel effectiveness within both DOE and the various operating and management (O&M) contractor organizations. If, as a result of its reviews, the Board determines that an imminent or severe threat to public health or safety exists, the Board is required to transmit its recommendations directly to the President, as well as to the Secretaries of Energy and Defense, with copies to the Committees on Armed Services and on Appropriations of the Senate and to the Speaker of the House.

The Board's enabling statute, 42 U.S.C. § 2286, requires the Board to review and evaluate the content and implementation of health and safety standards, including all applicable Department of Energy orders, rules, and requirements relating to the design, construction, operation, and decommissioning of DOE's defense nuclear facilities. Based on its assessments, the Board must recommend to the Secretary of Energy any specific measures, such as changes in the content and implementation of those standards, that the Board believes should be adopted to ensure that the public health and safety are adequately protected.

The Board is authorized to conduct investigations, issue subpoenas, hold public hearings, gather information, conduct studies, establish reporting requirements for DOE, and take other actions in furtherance of its review of health and safety issues at defense nuclear facilities. These ancillary functions of the Board and its staff all relate to the accomplishment of the Board's primary function, which is to assist DOE in identifying and correcting health and safety problems at defense nuclear facilities. The Secretary of Energy and contractors at DOE defense nuclear facilities are required to provide access to such facilities, personnel, and information as the Board considers necessary to carry out its health and safety oversight responsibilities.

Since its inception, the Board has conducted its business in a variety of ways. Thirty-three formal Board Recommendations, consisting of 147 individual recommendations, have been made to the Secretary of Energy concerning actions necessary to protect public health and safety. The first 32 sets of recommendations were accepted by the Secretary of Energy.

The Board's most recent Recommendation 95-2 entitled "Safety Management" was submitted to DOE on October 11, 1995. On January 17, 1996, the Secretary advised the Board she had accepted the recommendation in part. The Board is currently exploring with DOE the provisions in this recommendation that the Secretary did not accept for further resolution.

The Board has also met with DOE representatives on an ongoing basis and has frequently held public meetings, both at its offices in Washington and in the communities where defense nuclear facilities are located, covering a variety of safety-related issues. In addition, the Board has imposed several reporting requirements on the Department of Energy, using its authority under Sec.313 (d) of the enabling statute.

The Board's activities have been described in considerable detail in each of its Annual Reports. The Board's effectiveness in assisting DOE and its contractors in identifying and resolving health and safety issues has been cited by such outside organizations as the General Accounting Office, various Committees of Congress, the Office of Management and Budget, and by the Department of Energy. For example, at a public meeting in December 1994, the Secretary of Energy stated that she wanted to "acknowledge and applaud the role that the Defense Nuclear Facilities Safety Board has played in calling attention to important safety problems that needed priority attention at the Department of Energy." The Secretary went on to say that: "The Board has been tenacious and focused in providing recommendations for improvement. These recommendations have been extremely influential and beneficial in assisting the Department in maintaining focus on our nuclear safety programs and operations."

ONGOING TRANSITIONS IN THE DEFENSE NUCLEAR COMPLEX

The diminished demand for new nuclear weapons systems, coupled with heightened safety and environmental concerns, has resulted in profound changes in the mission of the Department of Energy's defense nuclear complex since the Board's creation. During the late 1980's, a number of defense nuclear facilities had been shut down, primarily due to safety concerns. At the time the Board began operations in November 1989, the Department's priorities emphasized returning those facilities to operation. This emphasis strongly influenced the scope and direction of the Board's initial reviews in late 1989 and early 1990.

During the early 1990's, international arms agreements led to a determination that many defense nuclear facilities were surplus to current needs. The collapse of the former Soviet Union further reduced the need for nuclear weapons production, and the Department initiated plans to consolidate its weapons design, production and testing activities at fewer facilities. Previous plans to return certain facilities to operation were shelved, leaving those facilities in an uncertain status; they were neither ready to be returned to full operation nor were they unloaded, cleaned out or mothballed.

As a result, some surplus defense nuclear facilities are now in the process of being prepared for cleanup and restoration to unrestricted access, while others are to be converted to new uses. The cleanup effort will require the Department of Energy to commit very large amounts of money and manpower to stabilize, decontaminate, and decommission former production facilities built and operated during the past 50 years. At the same time, national security considerations dictate that the Department retain the capability to assure the safety and reliability of the remaining weapons in the nation's nuclear arsenal, including the capability to conduct nuclear tests, should the President direct their resumption. A moratorium on nuclear testing remains in place; however, readiness activities continue, pending resolution of what experiments may be permitted under a future comprehensive test ban treaty.

Many of the safety issues arising from these extraordinary changes involve operations and processes that are new to the nuclear weapons complex. Many previously identified threats to public health and safety throughout the complex are yet to be resolved. These include, for example, characterization of the contents of radioactive waste storage tanks, deterioration of nuclear reactor fuel cladding in fuel storage basins; stabilization of plutonium residues; extensive radioactive contamination of soil in the vicinity of former nuclear chemical processing facilities; difficulties in conducting nuclear weapon dismantlement and modifications, and deficiencies in the areas of conduct of operations, criticality safety control, and definition, documentation, and achievement of safe operating conditions.

TECHNICAL CHALLENGES

Technical issues at DOE continue to evolve. The combination of well-recognized and long-standing threats to public health and safety, accompanied by potentially hazardous new activities, presents different and potentially serious challenges to public and worker health and safety. These include, for example, the need for DOE to:

- operate production facilities that have been shut down for extended periods to remove and stabilize radioactive or hazardous materials held up in processing lines and vessels;
- establish improved storage conditions to arrest extensive corrosion of spent nuclear fuel stored in basins that were not designed for long-term use;
- establish safe control of the existing inventories of chemical and radioactive wastes, which continue to grow and will become even larger when decontamination and decommissioning operations get underway in earnest;

- surmount technical problems associated with existing high-level radioactive waste storage tanks;
- design and construct new facilities for processing and storing radioactive wastes;
- ensure that dismantlement of approximately 2,000 nuclear warheads each year is conducted safely;
- design, construct, and operate facilities to store nuclear materials from dismantled nuclear weapons;
- consolidate weapon stockpile stewardship and management functions at a reduced number of sites;
- process and replenish tritium in nuclear weapons retained in service; and
- determine possible roles of existing research and development facilities for limited production missions, and institute the significant modifications to traditional laboratory operating practices that will be required to fulfill those roles.

The Board is concerned that these technical challenges, and others not yet identified, may be at least as large in number and just as severe and technically complex as those encountered during 50 years of production operations.

Changes in the mission of production facilities are leading to departures of experienced operating staff, either directly because of reductions in the work force, or indirectly because of perceptions of decreased attractiveness of the work to be done. This loss of operator expertise throughout the complex, has complicated the task of capturing and archiving safety-related information from departing personnel. Operations that depended heavily on the expertise of individuals, rather than on formal and codified safety processes, lose some margin of safety as these experts resign, retire or are reassigned. As key operating personnel leave, there is an erosion of the necessary base of information, knowledge, and expertise in facility designs, contents and expert-based administrative controls for hazardous operations. Recruiting and retaining high-quality personnel and maintaining the skill level of experienced workers are becoming increasingly difficult.

Many of the biggest technical challenges and uncertainties result from the poor physical condition of facilities. As facilities age, maintenance costs inevitably rise while budgets remain constant or decrease, often leading operating managers to stint on maintenance and upkeep. When this occurs, the condition of the facilities inevitably degrades. Detonation, fire, and corrosion hazards may increase as chemical compounds become unstable through time, changing their risk characteristics. Existing radiological hazards may become worse. Some materials being stored will decay naturally with time to materials that give off higher energy radiation and are more hazardous to handle than the original materials.

During the process of dismantling facilities, workers are likely to come in contact, often unexpectedly, with radioactive and chemical materials that have been inaccessible for many years, thereby significantly increasing their risk of exposure to these hazards. Contaminants may be driven into the environment by the dismantling process itself or by exposure to the weather. Shutting down a defense nuclear facility can actually increase the risk of dispersal of radioactivity above that encountered during routine operations as a result of material degradation, natural phenomena hazards, fires, or accidental nuclear criticality.

INDEPENDENT HEALTH AND SAFETY OVERSIGHT

The health and safety questions associated with the design, construction, operation, and decommissioning of DOE defense nuclear facilities involve extremely complex technical and scientific problems. In creating the Board, the intent of Congress was to bring the very best talent available to focus their expertise on these serious health and safety issues. By assembling a highly specialized cadre of nuclear experts, the Board was to "raise the technical expertise of the Department substantially, to assist and monitor the continued development of DOE's internal Environmental, Safety and Health organization, and to provide independent advice to the Secretary."

In addition, Congress sought to create an independent agency focused solely on public and worker health and safety issues in view of DOE's failure to establish a credible internal oversight program. "The Board must have a primary mission to identify the nature and consequences of any significant threats to public health and safety, to elevate such issues to the highest levels of authority, and inform the public."

As required by Sec. 320 (d) of the enabling statute, the Board's Fifth Annual Report, dated February 1995, included a self-assessment of the degree to which the overall administration of the Board's activities is believed to meet the objectives of Congress in establishing the Board. As part of this study, the Board conducted eight public hearings at locations in the vicinity of principal defense nuclear facilities, and a hearing in Washington, D.C., where testimony was received from the Secretary of Energy and other high-level DOE managers. The Board deliberated on the adequacy of its current statutory authority in light of its oversight experience during the past five years, and whether that authority should be amended or eliminated entirely. In summary, based on its evaluation, the Board concluded that:

- independent, external oversight of DOE's nuclear safety management of the defense nuclear complex is a vital function worthy of continuance;
- the Board's existing statutory authority is sufficient to achieve Congressional objectives in establishing the Board; and

- the Board, with its current "action-forcing" rather than formal regulatory authority, provides a cost-effective organizational arrangement for achieving the added safety assurance Congress, the Administration, and the public seek.

All facts considered, the Board believes it is essential to continue an independent external oversight agency as originally envisioned and authorized by Congress. Further, the Board advocates such continuance regardless of which agency of government, DOE or otherwise, manages the program for stockpile management or stewardship of the nation's nuclear weapons complex and the decommissioning of facilities no longer needed for national security.

PERFORMANCE GOALS FOR FY 1997

At present, the Board is the only independent, Federal agency with the scientific and technical talent to perform an oversight role on the health and safety issues associated with the DOE defense nuclear complex.

During the past five years of operation, the Board has advised the Secretary of Energy and other senior DOE officials on a wide variety of specific health and safety matters existing within the DOE weapons complex, as well as potential safety problems with proposed design, construction, operation, and decommissioning plans. In many instances, DOE officials were unaware of existing or potential problems until the issues were specifically brought to their attention by the Board. For example, the Board recently recognized that passive venting of process vessels at Rocky Flats was insufficient to prevent the buildup of contained hydrogen gas from plutonium solutions. Potential hydrogen explosions in such cases presented a previously unrecognized health and safety risk. After notification by the Board, the site contractor confirmed the hazard by sampling the tank vapor spaces and took corrective action.

During the next several years, the Board anticipates that the ongoing transition of the mission of DOE's weapons complex will continue to evolve. At the same time the weapons stockpile programs will demand continuing attention, while the legacies of aging facilities, widespread contamination, and highly toxic and radioactive waste products and residues from half a century of nuclear weapons production must be dealt with safely. As DOE realigns itself to accommodate mandated downsizing and responds to pressures to more rigidly comply with environmental, safety and health requirements, the role of competent, independent, external oversight will become even more demanding. Based on its experience during the past five years, the Board believes that its oversight function is an indispensable and cost-effective way to provide external oversight of DOE's program to deal with the myriad health and safety issues at defense nuclear facilities.

Within this broad context of external environmental, safety and health oversight, success or failure of the Board's independent oversight is best measured in terms of the added assurance of public and worker health and safety gained by having an independent technical group assisting the DOE and its contractors in finding and resolving safety issues throughout the nuclear weapons complex. Given the hazardous aspects of so many of the activities involved in the DOE weapons complex, the effectiveness of the Board's independent safety oversight is perhaps best demonstrated by the numerous advisories and recommendations that the Board has brought to DOE's attention, and the Secretary of Energy has accepted and implemented in the interest of improved environmental, safety and health protection.

The cost and benefits to the taxpayers of the Board's independent technical oversight must also be considered. A major accident during the assembly or disassembly of nuclear weapons would have a serious political, economic, and national security impact on the United States, with costs in the billions of dollars. Considering the serious health and safety problems affecting DOE operations in this area, and the potentially significant economic and health costs of a nuclear accident in a defense nuclear facility, a Federal commitment of $17 million in FY 1997 to support the Board's oversight operations is a small price.

During FY 1997, as in FY 1996, the Board will continue to place high priority focus on complex-wide safety issues, in the following areas:

- oversee the continuation of dismantlement and storage of weapons and weapons components - to help ensure protection of the health and safety of the public and the workers involved, and of the environment;

- evaluate proposed upgrades to facilities and processes vital to the stockpile stewardship and management programs - to ensure their design adequacy and their safe operation;

- closely monitor DOE's upgrading of its technical capabilities and expertise and those of its contractors - to verify the effectiveness of DOE's program for improving staff qualifications at the same time it seeks to meet demands placed on a dwindling staff;

- ensure that DOE expedites the processing, packaging and safe long-term storage of plutonium-bearing materials - to reduce the risk of unwarranted exposures to these hazards;

- review authorization bases prepared by DOE for priority facilities and activities - to verify conformance with established health and safety principles, including recent guidance prepared by the Board and its staff;

- monitor the integration of safety management of both defense nuclear research and development activities and weapon assembly, disassembly, and testing operations - to ensure that both can be accomplished effectively and safely;

- continue its close attention to DOE's program for resolving safety issues associated with existing inventories of corroding spent fuel in storage pools at several facilities and with byproduct material from defense enrichment operations - to assist DOE in gaining control of these potential and actual sources of significant contamination and radiological exposure;

- encourage DOE to continue to improve its radiation protection program - to reduce the risk of unnecessary worker exposures, as well as to reduce potential public exposures;

- maintain its close scrutiny of DOE's programs for safe handling and disposition of waste material to help DOE improve its waste management programs;

- evaluate DOE's ongoing expedited revision of its program for development and promulgation of requirements, including Orders, Rules, Standards, Guides and contract provisions, as well as reviewing DOE's programs for verification of adherence to those requirements - to ensure that DOE appropriately integrates these processes; and

- insist that DOE adopt sound systems engineering practices in all its safety-related projects and programs - to foster DOE's overall management of its safety program.

SECTION II -- FY 1997 BUDGET REQUEST

RESOURCE NEEDS

For FY 1997, the Defense Nuclear Facilities Safety Board requests $17,000,000 in new budget authority, and an FTE ceiling of 146. Due to continuing Federal budget constraints, the Board has limited its FY 1997 request for new budget authority to $17,000,000 -- equal to the FY 1996 appropriation for the Board.

To effectively execute its responsibilities, the Board has assembled a talented staff with extensive backgrounds in science and engineering. As of March 1, 1995, the Board had 98 full-time employees on board.[1] Two full-time site representatives are stationed at the Pantex site to oversee the safe disassembly of nuclear weapons, and two site representatives are stationed at the Hanford site to monitor waste characterization and stabilization. The Board assigned two full-time site representatives to Rocky Flats effective September 1, 1995 to monitor DOE's effort to stabilize and store the large plutonium inventory at the site. This budget request includes funds to recruit, as necessary, and retain technical personnel with experience in nuclear-chemical processing, conduct of operations, general nuclear safety analysis, conventional and nuclear explosive technology and safety, nuclear weapons safety, storage of nuclear materials and criticality safety, and waste management and environmental restoration. The Board plans to continue contracting for specialized outside technical expertise on a limited basis as necessary.

The Board fully supports and has taken the initiative to implement the President's proposed reductions in total administrative expenses. The additional administrative cost reductions proposed by the President for FY 1996 and FY 1997 are reflected in this budget request.

In summary, the Board is the only independent, technical organization with public health and safety oversight responsibility over the DOE defense nuclear operations. As thousands of nuclear weapons are dismantled and many sites and facilities are being shutdown throughout the complex, important and more complicated safety issues have arisen. While progress has been made by DOE in restructuring and implementing an improved internal safety management program, further improvements are needed. Solid internal environmental, safety and health management programs are necessary. This heightens the need for external oversight to ensure public health and safety.

The Board, with its current "action-forcing" rather than formal regulatory authority, provides a cost-effective organizational arrangement for achieving the added safety assurance Congress, the Administration, and the public seek. Our budget request of $17,000,000 will provide the funding needed to support the Board's health and safety review effort currently planned for FY 1997.

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[1] Employee total does not include the 5 full-time Board Members appointed by the President and confirmed by the Senate.

OBJECT CLASS SUMMARY

Our FY 1996 and FY 1997 expenditure plans, presented by object class accounts in Exhibits A and B, include our request for new FY 1997 budget authority of $17,000,000, and an actual appropriation of $17,000,000 for FY 1996. The Board proposes to utilize the budget resources requested in the following manner:

Salaries and Benefits -- The FY 1997 expenditure request includes funding of $11,715,000 to support the salary and benefit costs of up to 112 full-time staff. The funding for salaries and benefits represents 69 percent of the Board's FY 1997 budget request. In calculating the projected salary needs of the Board, the following pay increase factors were used:

For FY 1997 -- Assumptions

o A Federal pay increase of 2.1 percent is authorized beginning in January 1997;

The highly technical mission of the Board requires staff of the highest scientific and technical caliber with demonstrated competencies in all major phases of nuclear safety. Utilizing our "excepted service" hiring authority for scientific and technical personnel, the Board has made substantial progress in recruiting senior technical specialists, and is projecting salary and benefit requirements for 112 FTE's in FY 1996 and FY 1997. The average salary for the Board's technical staff is estimated to be $82,000 per year in FY 1997. Employee benefits are estimated at 24 percent of base salaries or $20,900 per FTE.

The recruitment and retention of scientific and technical staff with outstanding qualifications are critical to the successful accomplishment of the Board's mission. It is of paramount importance that the Board receive sufficient funds to meet the salary and benefit requirements of existing and future technical personnel.

Travel -- The Board requests $745,000 to support the official travel of the Board Members and staff. Extensive travel is necessary to the various Department of Energy defense nuclear facilities located throughout the United States in order for the Board Members and staff to fulfill the Board's statutory mission. The Board is required to react to incidents at the DOE defense nuclear facilities that may affect public health and safety, requiring unplanned travel expenditures to support our work at these sites. During 1995, Board Members, technical staff and the Board's outside technical experts made 173 visits to major defense nuclear sites in support of its public health and safety mission.

The Board is also authorized to station staff members at these sites during critical construction and testing periods. The Board has assigned technical staff teams to round-the-clock monitoring of major start-up, testing or restart activities at various DOE sites. The presence of

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

FY 1997 CONGRESSIONAL BUDGET REQUEST
(Data as of 01/31/96)

BUDGET ACCOUNT	FY 1995 OBLIGATIONS (ACTUAL)	FY 1996 BUDGET REQUEST	FY 1997 BUDGET REQUEST
PERSONNEL SALARIES -- (11)	$8,090,328	$9,055,000	$9,365,000
PERSONNEL BENEFITS -- (12)	$1,948,760	$2,200,000	$2,350,000
TRAVEL -- (21)	$557,168	$690,000	$745,000
TRANSPORTATION OF THINGS -- (22)	$199,444	$155,000	$155,000
RENTAL PAYMENTS TO GSA -- (23.1)	$1,572,211	$2,090,000	$1,530,000
COMMUNICATIONS & UTILITIES -- (23.3)	$131,785	$147,000	$147,000
PRINTING & REPRODUCTION -- (24)	$45,468	$37,000	$37,000
CONSULTING SERVICES -- (25.1) *	$3,453,555	$2,600,000	$2,000,000
OTHER SERVICES -- (25.2)	$1,126,368	$605,000	$605,000
GOVERNMENT SERVICES -- (25.3)	$94,510	$90,000	$90,000
SUPPLIES & MATERIALS -- (26)	$270,002	$310,000	$310,000
EQUIPMENT -- (31)	$219,973	$230,000	$230,000
*** TOTAL OBLIGATIONS ***	$17,709,572	$18,209,000	$17,564,000
NEW BUDGET AUTHORITY	$17,865,000	$17,000,000	$17,000,000
UNOBLIGATED BALANCE - PREV. FY	$1,841,838	$2,363,282	$1,154,282
RECOVERY OF PRIOR YR OBLIGATIONS	$366,016	$0	$0
TOTAL BUDGETARY RESOURCES	$20,072,854	$19,363,282	$18,154,282
EST. UNOBLIGATED BAL. - CUR. FY	$2,363,282	$1,154,282	$590,282
APPROPRIATION	$17,865,000 (Actual)	$17,000,000 (Actual)	$17,000,000 (Requested)
OUTLAYS	$15,999,474	$18,000,000	$17,600,000

Exhibit A

FY 1997 BUDGET REQUEST
Total Projected Obligations

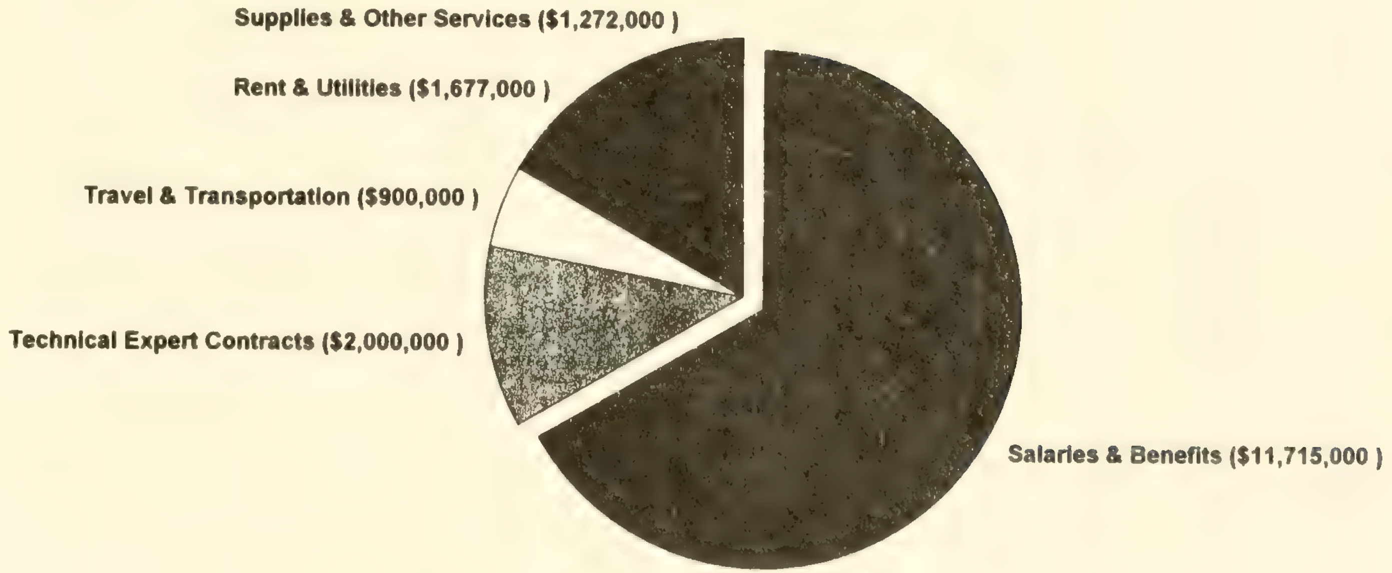

Exhibit B

technical staff has proved to be invaluable in providing the Board with first hand information on the problems DOE and its contractors encountered during such activities.

Travel funds are also used to support the Board's conduct of public hearings and meetings, where any interested persons or groups are invited to present comments, technical information, or data concerning health and safety issues at each facility. During 1995, the Board conducted 5 meetings/hearings at or near a DOE defense nuclear facility.

Transportation of Things -- The Board has included $155,000 in its FY 1997 budget request for the shipment of household goods for employees relocating to the Washington, DC area or to DOE sites.

Rental Payments to GSA -- The Board requests funds totaling $1,530,000 to reimburse the General Services Administration (GSA) for projected office rental costs. This overhead expense represents approximately 9 percent of our FY 1997 budget request.

The Board's lease on its Washington, DC office space expired in September 1995. During FY 1995, the Board worked with the GSA leasing officials in negotiating a lower lease cost. As a result, the Board will be paying approximately 5 percent less than its current charge for office space in FY 1997. The FY 1996 budget includes funds to pay for one time adjustments in office floor plans that are part of the new lease agreement, as well as set-up expenses that GSA may incur on behalf of the Board.

Communications and Utilities -- The FY 1997 budget request includes $147,000 for projected communications support costs. Funds in this account will be used for telephone services, postage costs, special messenger services, and equipment rentals.

Printing and Reproduction -- Our budget request includes $37,000 for reimbursing the U.S. Government Printing Office for publication of the required legal notices in the Federal Register. Routine printing and copying charges, including the Board's Annual Report to the Congress, are also included in this account

Consulting Services -- The Board has a broad mandate to carry out oversight functions to help assure public health and safety. If the Board is to be successful in carrying out those responsibilities, it must have the capability to technically evaluate total systems and the potential risks to worker safety and public health and safety. While the Board employs a highly capable staff, it is not practical or desirable to have permanent staff skilled in every specialty for which needs occur. For example, the safety evaluation of the In-Tank Precipitation Facility at Savannah River examined the potential buildup of explosive concentrations of benzene vapor in process tanks. Since benzene is not commonly encountered in the DOE weapons complex, outside technical expertise was needed and obtained, to review the process safety envelope.

The Board plans to continue to obtain outside technical experts in highly specialized areas. Expertise on the assembly and disassembly of certain weapon components may be needed on short notice.

Within the defense nuclear complex, the health and safety significance of aged facilities that were never designed to modern structural engineering standards has been, and continues to be, a major focus of the Board. The Board has been compelled to draw upon outside experts to supplement in-house capabilities in this very specialized area. Another example is in the area of standards assessment and training where the effort required is of such magnitude that the majority of the permanent staff would be required just to meet the Board's Congressionally mandated responsibilities in that one area. It is recognized, however, that the use of outside experts depends for its effectiveness on direction and guidance by Board staff with strong technical and managerial credentials. Thus, our outside technical experts bring specialized knowledge, and are used to complement internal staff capabilities.

Such expertise may be required for short periods with little advance notice should an imminent or severe threat to public health and safety be identified at a DOE defense nuclear facility. Therefore, it is extremely important to have the funds necessary to immediately contract for this expertise when needed. Each outside technical expert that the Board employs will continue to be carefully screened for conflict of interest.

During FY 1995, the Board obligated $3.5 million for technical support contracts with selected individuals or firms that possess special expertise in selected areas. A list of major technical support contracts, with a brief description of each contractor's areas of expertise, is included in Appendix B. The FY 1997 budget request includes $2 million in this account for technical support contracts to assist the Board in its health and safety reviews.

Other Services -- Our budget request includes $695,000 to fund the recurring administrative support needs of the Board in FY 1997 such as security services, court reporting expenses, employee training (e.g. mandatory EEO and ethics training), recruitment advertising, records storage and retrieval services, INTERNET information services provided to the public, and the cost of reimbursable support agreements with other Federal agencies for administrative services such as accounting, payroll, health unit, and drug-free workplace testing and support.

Supplies and Materials -- The Board requests $310,000 for the purchase and/or updating the technical reference information for our in-house library, as well as for continued access to various technical computer databases, and for general office supplies and materials.

Equipment -- The FY 1997 budget request includes $230,000 to upgrade the existing capacity of our electronic records storage and retrieval system and our computer network. The Board has compiled extensive technical files that are open to public review at the Board's offices in Washington, D.C. Using the above computer based indexing and retrieval system, the Board's staff, DOE staff and its contractors, and the public can access electronically over 1.2 million pages of technical information covering current public health and safety issues associated with the DOE defense nuclear complex. Also, the Board plans to purchase additional computer work stations to replace hardware made obsolete by the rapid advance of computer software and communication technologies that demand faster and more memory-intensive desk top computers.

SECTION III -- TECHNICAL PROGRAM ACTIVITIES

The Board has recruited a technical staff with multi-disciplinary scientific and technical backgrounds. With the changing character of the Department of Energy defense nuclear mission, from production to disassembly and decommissioning activities, the Board has redirected the health and safety review assignments of its staff and outside experts. Appendices D and E set forth summaries of the Board's actual and projected usage of its technical staff and outside technical resources by major site and by major technical review area.

RECOMMENDATIONS TO THE SECRETARY OF ENERGY

The Board's enabling legislation prescribes the process by which the Board makes formal Recommendations to the Secretary, including the step-by-step procedure to ensure that the Board's actions and the Secretary's responses are made available to the public in a timely fashion. In general, that process has been effective. The Secretary has accepted the Board's Recommendations within the specified periods, or has formally requested extensions which the Board has found justified and approved. For some of the Recommendations, however, development of acceptable implementation plans has been slow. To address this shortcoming, the Board assigned knowledgeable DNFSB staff members to work with cognizant DOE counterparts in the preparation of implementation plans and this has proven to be helpful and productive.

Thirty-three formal Board Recommendations, consisting of 147 individual Recommendations, have been made to the Secretary of Energy concerning actions necessary to protect public health and safety. The first 32 sets of Recommendations were accepted by the Secretary of Energy.

The Board's most recent Recommendation 95-2 entitled "Safety Management" was submitted to DOE on October 11, 1995. On January 17, 1996, the Secretary advised the Board she had accepted the recommendation in part. The Board is currently exploring with DOE the provisions in this recommendation that the Secretary did not accept for further resolution.

In general, the Board's Recommendations have emphasized:

- identifying, assessing the adequacy of, and applying appropriate design and operating standards;
- selecting, training, qualifying, and retaining technically competent operations, maintenance, and technical support personnel;

- applying the principles of systems engineering in evaluating the design of new facilities and in upgrading existing facilities;
- conducting timely and comprehensive Operational Readiness Reviews (ORR's);
- improving the Department's radiation protection program, including measures for control of radioactive sources and contamination;
- assigning well-qualified DOE Facility Representatives at defense nuclear facilities;
- resolving expeditiously many pressing issues surrounding the stabilization and safe storage of fissionable materials and production residues; and
- integrating various modalities for binding requirements, such as Rules, Orders and Contract provisions.

Appendix C lists key milestones associated with the Board's Recommendations.

REVIEW AND EVALUATION OF STANDARDS

The Board's enabling legislation mandates the Board to review and evaluate the content and implementation of standards relating to the design, construction, operation, and decommissioning of the DOE's defense nuclear facilities. Since sound safety standards are the foundation of any nuclear safety program, the Board continues to employ a three-pronged approach to the implementation of this mandate:

- First, the Board continues to insist that DOE identify the safety standards it considers applicable throughout the defense nuclear complex.
- Second, through DOE's implementation plans for a series of standards-related Recommendations, the Board continues to emphasize the need for DOE's continuing review of the adequacy of its safety standards compared to accepted industry practice, and for timely revision of those standards, when upgrading is called for.
- Third, the Board continues to emphasize the need for DOE to demonstrate its substantive compliance with applicable standards at each defense nuclear facility.

DOE efforts in this subject area have received considerable attention from the Board. Recommendation 90-2, supplemented by Recommendations 91-1, 93-1, 94-2 and 94-5, has served as the primary vehicle for this work. Execution of the Recommendation 90-2 Implementation Plan has finally begun in earnest. DOE is developing a series of formal documents that identify the standards and requirements that apply to individual defense nuclear facilities. As a specific element of the plan, DOE expects to develop and submit to the Board for review approximately 20 of these Standards and Requirements Identification Documents (S/RIDs) for each of more than 40 individual facilities or sites, between now and 1997.

Board oversight of this development effort will require significant resources, after which the number and depth of Board site and facility evaluations will be adjusted as needed to properly monitor implementation of the S/RIDs in the field. In conducting these site and facility evaluations, the Board plans to verify substantive compliance with the requirements, rather than conducting line-by-line audits to determine precise conformance with each specific detail. In addition, priority will continue to be placed on those defense nuclear facilities representing the greatest hazard to public health and safety or the environment, especially those undergoing changes in status (e.g., from standby to operational).

Significant Board resources have been devoted to conducting a comprehensive evaluation of the adequacy of existing DOE Orders and their associated guidance, in direct comparison with those commercial or consensus standards in use in industry today. This effort is being followed by an ongoing review of proposed rules and revised DOE Orders, and their associated implementation guides and standards, in order to verify that:

- an appropriate balance of requirements and guidance for defining an adequate basis for protection of the worker, public, and environment is maintained; and

- safety requirements contained in existing DOE Orders have not been eliminated without adequate technical justification.

DOE efforts to improve the safety standards it implements have often involved application of standards in areas in which the Department has previously provided little or no guidance. For example, major revisions of DOE orders defining nuclear explosive and weapons operations are nearly complete, and seven completely new standards or guides arising from those orders are in late stages of the development process. Under close Board scrutiny, DOE has continued its efforts to develop additional new standards in such critical areas as plutonium processing and storage and coping with hazards from natural phenomena. Significantly improved standards are also being developed in several other specific areas, most notably configuration management, and transition and decommissioning activities (life cycle asset management). Board efforts related to standards will intensify as additional DOE guidance and safety standards for other functional areas near completion.

Clean-up operations are rarely as routine or predictable as production operations. Many health and safety standards for transition, decontamination and decommissioning, and environmental restoration await development or refinement. All such standards require implementation on a much wider scale than has been the Department's practice regarding standards to date. There is no widely-accepted body of knowledge or experience to guide these standards development and implementation efforts. Furthermore, there are not enough individuals properly trained and qualified in standards development and implementation. DOE continues to experience difficulties developing an integrated programmatic response to the Board's Recommendations in this critical area.

DOE's safety standard improvement efforts also involve significant aspects of the statutory provisions of the Price-Anderson Amendment to the Atomic Energy Act. DOE rulemaking efforts in response to the amendment have been closely examined by the Board, in accordance with its statutorily mandated responsibility to review and evaluate the content of DOE standards. Specifically, each proposed rule and its associated implementation guides and standards continue to be scrutinized in detail by the Board to ensure that the Department provides protection of the health and safety of the public, including on-site workers.

Currently, there are several hundred DOE orders pertaining to the broad spectrum of DOE's responsibility, including procurement; personnel policies; administrative affairs; and protection of environment, safety and health. Of this large set of orders, the Board has identified a selected set of 51 DOE safety orders which contain standards, requirements and guidance related to protection of health and safety of workers, the public and the environment.

During the past several years, DOE has revised, improved, and upgraded these safety orders in response to many factors, including not only Board recommendations, but also DOE and contractor initiatives and a general recognition of the importance of safety standards and requirements in establishing an effective safety management program. These orders provide the basis for existing DOE requirements at defense nuclear facilities.

During 1995, DOE initiated a major "Order/Requirement Reduction Effort" under the supervision of the DOE Office of Environment, Safety and Health (EH). After reviewing initial drafts of order changes under this effort, it appeared that wholesale deletions of necessary safety requirements were likely to occur. Therefore, the Board's staff and outside experts extensively reviewed the orders of interest to the Board, and DOE's implementation of these orders in the field. Based on that review effort, the Board found that a majority of the requirements and guidance in the existing 51 orders were necessary and should be retained. The Board further found that some improvements were needed, and that the requirements and guidance contained in DOE-4700.1 (*Project Management*); DOE 6430.1A (*General Design Criteria*); and DOE 5820.2A (*Radioactive Waste Management*); should be reviewed. On the other hand, it appeared the DOE 5480.18B (*Nuclear Facility Training Accreditation Program*) might be unnecessary for low hazard facilities, provided DOE 5480.20A (*Personnel Selection, Training and Qualification Requirements for DOE Nuclear Facilities*) was rigorously implemented. This material was summarized at a public meeting of the Board on Standards-Based Safety Management held in Washington on May 31, 1995.

This recent DOE effort essentially amounts to a realignment of the entire framework upon which the Department builds its safety management program. The difficulties encountered by the Board in overseeing DOE's activities in this area have been compounded by the fact that DOE itself has not settled upon a single course of action to be followed. Rather, other competing, and often contradictory paths, are being seriously considered - some being actively pursued - including: addressing comments in the Galvin Report regarding "burdensome" DOE Orders; reducing or even eliminating all DOE Orders; "rebinning" (sorting requirements into new arrangements) existing DOE Orders; and eliminating most, if not all, safety-related Order requirements in favor of a "necessary and sufficient" safety process. The confusion arising from this multi-pronged effort has been addressed by the Board in Recommendation 94-5, which emphasizes the need to integrate DOE safety-related Orders, standards, and rules.

DOE efforts to improve the safety standards applied at facilities involved in the assembly, disassembly, and testing of nuclear weapons have been proceeding slowly, and are expected to continue throughout the coming year. The analysis conducted by DOE in response to Recommendation 93-1 identified a wide variety of technical areas where safety standards used for nuclear explosive facility operations were not comparable to other defense nuclear facilities or similar commercial facilities. The resulting standards development efforts currently underway are being closely monitored by the Board. Unfortunately, there has been only limited interaction among the internal DOE offices conducting this effort and those conducting the effort to improve safety standards for non-weapons defense nuclear facilities. An example of the problems created by this lack of integration is the revelation noted in Board Recommendation 93-1 that standards applicable to the nuclear weapons program were severely limited in scope compared to standards for other defense nuclear facilities.

Correcting this deficiency will entail a major cultural shift from an expert-based safety management program to a standards-based safety program. The process of examining the adequacy of standards applicable to weapons facilities has expanded to include an examination of safety aspects associated with research and development in the DOE laboratory complex. The Board expects that DOE's efforts to address these issues, and associated monitoring activities of the Board, will continue well beyond FY 1997.

Within the past year, the Board has initiated a dialogue with senior DOE managers and representatives of the weapons laboratories on integrated, standards-based safety management of research and development activities. Oversight of development of tailored sets of health and safety related standards and requirements appropriate for these activities will be an important and continuing focus for the Board for the next several years. The lessons learned during the development and the technical review and approval phases for these standards-based safety management systems will undoubtedly have applicability elsewhere.

PUBLIC PARTICIPATION

The Board continues to be sensitive to the need for public involvement and awareness of defense nuclear safety issues, and has found public meetings to be a very effective tool in encouraging responsiveness on the part of Department representatives. The Board has continued its practice of meeting frequently with state and local officials, labor leaders, DOE facility workers, public interest groups, and area residents, to exchange information and to inform interested parties of the Board's work. In addition, the Board has held a total of 28 public meetings near the following DOE sites:

- Savannah River Site -- 7 meetings
- Rocky Flats Environmental Technology Site -- 7 meetings
- Hanford Site -- 4 meetings
- Pantex Plant -- 2 meetings
- Idaho National Engineering Laboratory -- 2 meetings
- Sandia/Los Alamos National Laboratories -- 2 meetings
- Oak Ridge National Laboratory -- 2 meetings
- Fernald/Mound Plants -- 1 meeting
- Lawrence Livermore National Laboratory -- 1 meeting

At each of these meetings, the Board invited interested persons or groups to present comments, information, or data involving subjects specific to the purpose of the meeting.

The Board has also held 21 public meetings at its Washington, DC offices where, among other topics, the Board, its technical staff, and outside experts discussed the status of work in the standards area, as well as health and safety reviews at DOE defense nuclear facilities. The Board expects to schedule additional public meetings during FY 1997 and beyond.

In addition to these public meetings, members of the Board's staff have provided information briefings to local officials and public interest groups in the vicinity of the Pantex Plant, and the Savannah River, Hanford, Fernald, and Rocky Flats Environmental Technology Sites.

Notices of such public Board meetings are published in the Federal Register and are mailed to more than 350 organizations and individuals who have requested to be on the Board's mailing list. In addition, each notice is published three times in several local newspapers serving the communities near the DOE facility involved.

In July 1995, the Board established a Home Page on the INTERNET, to further expand public access to Board records and deliberations. The Bulletin Board lists, among other things, the entire text of all Board Recommendations, the Board's most recent Annual Report, biweekly updates of the log of all correspondence/documents sent or received by the Board, and other background information on the Board's health and safety review activities. This public information service has proven to be extremely popular.

RADIOLOGICAL AND ENVIRONMENTAL HEALTH AND SAFETY

Based on the weaknesses identified in its early reviews of DOE's radiation protection program, the Board issued Recommendation 91-6. The areas of program weakness included: (1) DOE management and leadership in radiation protection programs; (2) radiation protection standards and practices at defense nuclear facilities; (3) training and competence of radiation protection technicians and supervisors; (4) analysis of reported occurrences and correction of radiation protection program deficiencies; and (5) understanding and attention to radiation protection issues by individuals in DOE and its contractor organizations.

Major slippages in DOE's schedule for implementation of Recommendation 91-6 have occurred, and in July 1995, the Board established a reporting requirement in accordance with its statutory authority, calling on DOE to submit to the Board a report which would: (1) revise the schedule for all missed commitments and milestones; (2) identify the problems that caused the delays; (3) describe corrective actions to be taken; and (4) identify a single DOE official with overall authority for implementation of the recommendation. The Department's response was in preparation at the time this budget request was written.

During FY 1997, the Board will continue to emphasize implementation of Recommendation 91-6 and to address other important radiation protection issues affected by DOE's changing mission. Among the changes that have important effects on these issues are those involving facility decommissioning, weapons dismantlement, site environmental restoration, and waste management. Changes in these areas are likely to have significant implications for worker and public health and safety. For example, specific radiation protection matters likely to be affected include: development and promulgation of standards for release of decontaminated materials; expansion of programs for environmental monitoring; planning for work in hazardous environments; and development of radiation control performance indicators applicable to unique cleanup situations.

Board Recommendation 94-2 was issued by the Board to call the Department's attention to the need to conform to industry-accepted safety standards at DOE low-level nuclear waste disposal facilities, and to develop appropriate low-level waste (LLW) management standards where none exist. By FY 1997, the Board expects that DOE will have made significant progress in its efforts to assess the adequacy of its standards for disposition of LLW. Implementation of corrective actions resulting from a complex-wide vulnerability assessment of LLW disposition should be well underway, and new performance assessment standards, yet to be developed, should more accurately reflect safety and health issues associated with LLW disposition. In addition to monitoring these LLW standards activities over the next 18 months, the Board will also review DOE's efforts to implement a systematic approach to LLW management throughout the DOE complex. These Board assessments will address LLW disposition issues at the Hanford and Savannah River Sites, the Los Alamos and Oak Ridge National Laboratories, and the Idaho National Engineering Laboratory.

The Board will continue its ongoing program of assessments of site and facility-specific radiological and environmental protection programs and of on-site implementation of Recommendation 91-6. Such radiation protection assessments have already been conducted at most of the facilities in the defense nuclear complex, but assessments of environmental protection have thus far been completed at only seven sites. Waste management assessments have been performed at the Hanford and Savannah River Sites, Los Alamos and Sandia National Laboratories, and the Nevada Test Site. These evaluations will receive more Board attention in the coming years, including during FY 1997.

During FY 1997, the Board also intends to continue its studies of generic, site or complex-wide technical concerns as they arise. Examples of previous studies include: external dosimetry at the Pantex Plant and throughout the complex; the burning of high explosives containing uranium at Pantex; the role of DOE's Radiation Control Coordinating Committee in improving radiation protection practices; radiation control of radiography activities; and radiation hazards of waste tanks at Savannah River. A study of implementation of the As Low As Reasonably Achievable (ALARA) principle in planning for work in areas with radiological and other hazards is now underway.

SITE-SPECIFIC ACTIVITIES

Priorities for the Board's oversight activities at specific sites are set primarily on the basis of: (1) potential risk to public health and safety; (2) effectiveness of DOE's management of those risks; and (3) timeliness in relation to DOE programmatic or operational goals and objectives. If the Board were to learn of an imminent or severe threat to public health and safety at a DOE facility, it would respond and adjust priorities as necessary. In assessing priorities, the Board also considers problems brought to its attention by various outside sources, including Members and staff of the Congress, the General Accounting Office, and the public.

WEAPONS FACILITIES

Because nuclear weapons remain a vital component of United States national security policy, the activities and facilities that are essential for stockpile stewardship and management must be reliably maintained without interruption. DOE is responsible for maintenance and support of the active stockpile, including the capability to resume nuclear testing or treaty-permitted experiments, by Presidential direction. DOE is also responsible for day-to-day operations involving the dismantlement of thousands of retired nuclear weapons and the disposition of nuclear and other hazardous materials that result. Board initiatives have already resulted in efforts by DOE to significantly upgrade its approach to safety management of stockpile support and dismantlement activities, but full implementation of these improvements will take several years. Continued Board attention will be required to ensure the necessary degree of improvement is achieved, on an acceptable schedule, and in a fully integrated manner.

In this connection, a recent Board initiative focused on the integration of safety management at the national weapons laboratories, which have lagged behind other defense nuclear facilities in establishing standards-based safety management systems. This is due to a variety of factors, including expressed concern that many safety requirements developed for production plants unnecessarily restrict the flexibility needed for creative research and development (R&D). Within the past year, the Board made inquiries of DOE that were intended to lead the weapons laboratories and DOE towards development of an integrated, standards-based safety management system for R&D activities, and the establishment of a technically-based internal oversight process. The Board has continued to press for resolution of these issues in follow-on meetings with senior DOE managers and with the heads of the weapons laboratories. Transition to fully integrated safety management systems at the laboratories is anticipated to extend beyond FY 1997.

DOE's traditional dependence on experts for the management of safety continues to be a problem at its weapons facilities. The loss of experienced weapons program personnel that began in the late 1980's continues to affect DOE's ability to address both facility-specific and weapon system-specific safety problems in an integrated and systematic manner. In response to Board Recommendation 93-6, DOE formally committed to a long-term program to capture the knowledge, skills and abilities of departing experts. The Board has focused on this issue in recent meetings with representatives of DOE and the weapons laboratories, and attention to this subject will remain a primary Board focus.

DOE's plans for implementation of its Stockpile Stewardship and Management Program extend over the next fifteen years. The preparation of an environmental impact statement for this program was initiated in late FY 1995. DOE's proposed approach will require oversight activity by the Board to ensure application of sound systems engineering techniques for facility modifications, integrated safety management, and responsible waste management and decommissioning strategies. The current DOE proposal to use traditional research and development facilities intermittently to provide a limited, but highly flexible, manufacturing capabilities will require the Board's close attention throughout the next several years, particularly in the areas of standards-based safety management, formality of production operations, and readiness of facilities and activities to proceed.

PANTEX PLANT -- In response to the demanding nuclear weapon dismantlement activities, which continue at a rate targeted by DOE at 2000 warheads a year, the Board has stationed two full-time Site Representatives at Pantex to provide daily on-site coverage. In addition, Washington-based members of the Board's staff travel frequently to Pantex to evaluate such functional areas as:(1) nuclear explosive safety studies; (2) program and facility startup activities, (3) radiological protection, and (4) safety system design, maintenance, and surveillance operations. Enhancements to each of these programs are being implemented at Pantex in response to Board initiatives; the Board will continue to monitor the programs to ensure full implementation. The Board will also evaluate technical areas that have historically been problematic at Pantex, including implementation of standards; recruitment, retention, education, and training of qualified technical personnel; safety aspects of conduct of operations; the identification and control of the facility authorization basis; and associated national weapons laboratory support.

Board Recommendation 92-6 led to modification of DOE's readiness review process for weapon operations, but full implementation of the improved process has been slow and uneven. DOE has recently taken a new approach for developing procedures for weapon operations that has demonstrated real risk reductions, compared to traditional procedure development methods. Full implementation of this improvement will continue over the next several years, and will be closely monitored by the Board.

Pantex is in the process of upgrading its Safety Analysis Reports (SARs) to meet current DOE requirements. The Bases for Interim Operations for Pantex facilities (pending completion of the SARs upgrade program) have also been improved. However, the Board's preliminary reviews of these elements of the overall Pantex safety authorization basis have identified technical deficiencies; Board review will continue over the next several years as DOE's efforts to upgrade the Pantex analytical basis for operational safety proceed.

A three-month stand-down of Pantex operations was initiated in 1994, when the contractor determined that the performance of some systems important to safety could not be assured, as required. The efforts by both DOE and contractor personnel to identify the root causes of the situation led to the development and initiation of sweeping improvements in configuration management, design recovery, engineering control, and conduct of operations. The Board continuously monitors the implementation of these improvements. Full implementation will be highly dependent on the success of efforts by both DOE and the contractor to upgrade the technical capability of personnel at Pantex, and is expected to require several years of concentrated effort.

A new special nuclear material staging facility at Pantex is scheduled to be completed and begin operations in FY 1997. The Board plans to review the design, construction, and operational readiness for this new facility.

NEVADA TEST SITE -- Underground nuclear testing at the Nevada Test Site (NTS) remains under a Presidentially-mandated moratorium, but DOE has been directed to maintain the capability to conduct nuclear tests. The extent NTS of nuclear testing-related activities that will require the expenditure of Board resources is not fully defined at this time, since international negotiations currently underway may establish acceptable limits on tests or experiments . In keeping with DOE's mandate to be prepared for possible test resumption, Board oversight activities continue.

Nuclear testing historically has been an intensely expert-based enterprise integrating nuclear explosive handling protocols, advanced electronic firing control and diagnostic systems, horizontal tunnel and vertical shaft drilling and construction techniques, and radiological control hardware and processes. In the past, maintenance of the skills and knowledge necessary to perform these testing activities safely has depended heavily on the large number of on-the-job training opportunities resulting from a robust testing schedule.

The Board's recent activities at NTS have included a review of ongoing efforts to capture and archive safety-related skills and knowledge, upgrades to the nuclear safety analysis process and supporting documentation, and the exercise program that is being used to maintain testing capability. Board Recommendation 93-6 highlighted the need to capture, document, and formally exercise safety-related skills and knowledge. Development of a new readiness assessment process was completed in late FY 1995, in response to Recommendation 92-6. DOE's combined response to Board Recommendation 93-1, and to a 1993 reporting requirement established by the Board concerning Nuclear Explosive Safety Study, is yielding significant enhancements to the process used to evaluate nuclear explosive operational safety. These types of reviews are anticipated to continue through FY 1997.

OAK RIDGE SITE -- The Y-12 Plant, the nation's repository for highly enriched uranium, has been the main focus of the Board's health and safety reviews . In late 1994, the Board identified problems involving criticality safety and formality of operations at the Y-12 Plant that led to issuance of Recommendation 94-4. The identification of these problems also led the Oak Ridge contractor to curtail nuclear operations at Y-12.

Since FY 1995, the Board has focused intensive review efforts on DOE and contractor activities to correct the safety problems that precipitated the Y-12 shutdown, and on associated defense nuclear-related restart operations. During the shutdown period, the Board also provided safety oversight for special operations involving the receipt of nuclear materials from the former Soviet Union state of Kazakhstan ("Project Sapphire"). While Y-12 is expected to resume routine operation in FY 1996, final resolution of the root causes of the safety problems addressed in Board Recommendation 94-4 will require continuing Board attention through FY 1997. In addition, the Board will closely monitor activities associated with DOE's plans to store at the Y-12 Plant much of the highly enriched uranium that is currently located at other sites.

Earlier Board reviews identified deficiencies in DOE and contractor management of cylinders containing depleted uranium hexafluoride at the Oak Ridge K-25 Plant and at the Portsmouth and Paducah gaseous diffusion plants, which were communicated to the Secretary of Energy in Board Recommendation 95-1. Activities necessary to resolve those deficiencies will continue through FY 1997, as will the Board's oversight of them. Other areas of continuing Board activity at the K-25 Plant will include remediation of residual highly enriched uranium from defense programs activities and environmental restoration programs.

At the Oak Ridge National Laboratory, the Board's activities have focused on issues associated with implementation of the Board's Recommendation 94-1, safe storage of Uranium-233 remaining from defense programs, and environmental management. These issues will continue to require Board oversight through FY 1997.

LOS ALAMOS NATIONAL LABORATORY -- In FY 1994, Los Alamos National Laboratory (LANL) initiated a self-imposed shutdown of its Plutonium Facility, TA-55-4, after a Board-requested review identified a breakdown in control of the safe operating envelope. Laboratory efforts to resume operations after this shutdown significantly improved LANL's understanding of the limiting conditions of operation for this facility, and the activities necessary to maintain appropriate operational safety requirements. Over the next several years, the Board will monitor LANL's progress in transferring the lessons learned from the TA-55-4 experience to other defense nuclear facilities at the site.

The safety analyses for LANL's defense nuclear facilities generally do not meet current DOE guidance on Safety Analysis Reports (DOE Order 5480.23). Upgrades planned for safety documentation on key LANL facilities will be reviewed by the Board as they become available. DOE and laboratory responses to the Board's recent initiative to integrate the safety management of nuclear research and development activities are expected to result in enhancement of facility operational safety, and the Board intends to monitor the process.

The Board has recently examined the definition and maintenance of safe operating envelopes for the defense nuclear facilities at the Los Alamos National Laboratory (LANL), including the handling of seismic issues. LANL intends to upgrade or expand several defense nuclear facilities over the next few years. At least one LANL facility that has not previously been involved in defense-related work will be re-designated as a defense nuclear facility. All of these activities will be reviewed carefully by the Board.

LAWRENCE LIVERMORE NATIONAL LABORATORY -- In response to deficiencies identified during a Board review, nuclear operations at the Lawrence Livermore National Laboratory (LLNL) Plutonium Facility were shut down by contractor management in

FY 1995 because Technical Safety Requirements that formed a portion of the facility's safety authorization basis had not been adequately implemented after approval of a new Safety Analysis Report. Board oversight of corrective actions at the Plutonium Facility will continue through FY 1997, as will the Board's assessment of the adequacy of the transfer of the lessons learned to other defense nuclear facilities.

In the past, LLNL management had voiced reservations concerning DOE's Order Compliance Verification program, based on a concern (which was shared by the other two weapons laboratories) that the process DOE had prescribed to demonstrate compliance was unduly inflexible, and was felt to be especially burdensome for research and development facilities. Response to the Board's 1995 initiative on research and development safety should address these laboratory concerns, as DOE and the laboratories work to develop, implement, and oversee integrated, standards-based safety management systems appropriate for research and development activities. It is anticipated that the Board's oversight of the corrective actions implemented at the laboratories in this area will continue through FY 1997.

SANDIA NATIONAL LABORATORIES -- Major defense nuclear facilities operated by the Sandia National Laboratories (SNL) include the Annular Core Research Reactor (ACRR); the Sandia Pulse Reactor Facility (SPRF); the Hot Cell Facility (HCF); and several nuclear material storage facilities, all in Albuquerque, New Mexico; and the Tritium Research Laboratory in Livermore, California. In FY 1995, the Board reviewed safety management at the ACRR, including a detailed examination of both radiological control and maintenance practices. Other recent Board review activities at SNL have focused on reported violations of operational safety requirements, a criticality mass limit infringement, and conduct of an emergency preparedness exercise.

DOE is considering the establishment of a national production source for an important medical isotope, molybdenum-99 (Mo-99). The ACRR is the primary facility being considered for this production mission. An Environmental Assessment of this proposed action resulted in a DOE decision to prepare an Environmental Impact Statement. Use of the ACRR for Mo-99 production would require physical and operational modifications to both the reactor and to the HCF, which will be used for radioisotope chemical separation operations. If the Department continues this effort, the Board will review the incorporation of these modifications into the ACRR and HCF safety bases, considering both design and operational readiness aspects of the changed mission.

A new pulse reactor is being constructed at SNL's Albuquerque site to replace an existing unit at SPRF. Review of this construction project will require the commitment of additional Board resources. Although manufacture of the reactor fuel has been delayed due to the curtailment of Oak Ridge's nuclear material production operations, startup of the new reactor could occur in late FY 1996 or early FY 1997.

MOUND PLANT -- Primary activities at the Mound Plant include repackaging and off-site shipment of nuclear materials, nuclear waste management and cleanup, and decontamination and decommissioning of site buildings. Processing of tritium and assembly of radioactive power sources for space vehicles are also performed.

Over the past year, the Board reviewed a planned two-year program to unload tritium reservoirs. That review disclosed the need for a readiness review before commencing operations, and the Board so informed DOE. Early in its readiness review, DOE identified a number of deficiencies indicating that the contractor was not ready to begin unloading operations. An action plan to correct the deficiencies was developed and is in the process of completion. DOE will conduct a *de novo* readiness review after the deficiencies are corrected. The Board intends to continue its oversight of the tritium unloading program during FY 1997 and to devote attention to the transfer of tritium operations from Mound to other sites as part of DOE's proposed reconfiguration program.

As Mound's mission changes from production to decommissioning, the Board intends to devote attention to such related health and safety issues as: repackaging of uranium and plutonium materials for stabilization and off-site shipment, transition of facilities from operation to a decommissioned status, radioactive and mixed waste compaction and storage, facility decontamination, and site remediation and cleanup.

PINELLAS AND KANSAS CITY PLANTS -- The Pinellas Plant's defense nuclear functions have been transferred to the Kansas City Plant, LANL, and SNL, and the site has been prepared for sale by DOE. No additional oversight of Pinellas by the Board will be required in the future.

The Kansas City Plant's current mission involves a consolidation of non-nuclear weapons program support functions that had been previously performed at other DOE sites; a small amount of radioactive waste from previous defense-related programs is also stored on-site. The Board will continue to follow the evolution and impact of DOE's reconfiguration and consolidation plans on the Kansas City Plant through FY 1997.

MATERIALS PROCESSING AND WASTE MANAGEMENT FACILITIES

HANFORD SITE -- The Board's health and safety review activities at Hanford reflect the following Hanford site-specific priority review areas:

- safety issues associated with corrosion and storage of spent fuel in the K-Basins;
- the need for prompt, long-term, and safe processing, packaging and storage of plutonium-bearing material at the Plutonium Finishing Plant; and
- safe handling and disposition of nuclear waste - an issue that applies to several activities at Hanford, but particularly to the Tank Waste Remediation System.

Each of these priority review areas has been the subject of one or more Board Recommendations. Monitoring DOE's implementation of these recommendations will remain a Board priority during FY 1997 and beyond.

The K-East Basin at Hanford contains spent nuclear fuel that is highly corroded and is corroding further at an accelerating rate. This issue is exacerbated by the fact that the basin is located close to the Columbia River, has a history of leaking, and is not seismically qualified. Hanford's approach to addressing these safety issues is set forth in DOE's implementation plan for Board Recommendation 94-1. The Board intends to continue its evaluation of K-East Basin activities during FY 1997, including review of the following DOE/contractor activities:

- improving facility readiness, including radiological controls, procedure upgrades, and improvements in conduct of operations;
- making facility modifications, including installation of seismic barriers and safety system modifications;
- characterizing the fuel; and
- designing removal and stabilization systems for the fuel elements and accumulated sludge .

At the Plutonium Finishing Plant, there is an urgent need to resolve safety issues associated with the large inventory of plutonium-bearing materials. In this connection, the Board intends to review the following activities during FY 1997:

- packaging of plutonium metal and oxide and stabilizing plutonium solutions and residues in accordance with DOE's implementation plan for Recommendation 94-1;

- development of the Environmental Impact Statement for cleanout and stabilization of the entire facility; and

- interim actions necessary to address immediate safety concerns associated with plutonium sludges and chloride based plutonium solutions.

The Tank Waste Remediation System (TWRS), which involves characterization, retrieval, processing, and eventual disposal of high level radioactive waste, has been the subject of several Board Recommendations. Among these, Recommendation 93-5 calls for the expedited characterization of Hanford's high level radioactive waste, and Recommendation 92-4 calls for a systems engineering process to be used in the life cycle development process. In this area, the Board plans to pay close attention to the following activities during FY 1997:

- development of an acceptable technical basis and strategy for sampling and characterizing the tank wastes; and

- development of a fully descriptive technical baseline for the Tank Waste Remediation System. A recent DOE review indicated that the TWRS program assumptions could not be validated and that TWRS proceeds only at great programmatic and financial risk. Delays that prevent timely remediation of this stored waste constitute a serious safety issue.

Due to the level of activity at Hanford, the Board established a continuous on-site presence at this site in June 1994, by assigning an experienced staff member as its full-time Hanford Site Representative. This staff assignment has contributed to early and more complete identification of safety issues at the site. The Site Representative has also been able to communicate issues of concern to the Board directly to senior DOE and contractor management. The Board plans to add a second site representative in FY 1996 in order to maintain more complete coverage of the Hanford Site.

SAVANNAH RIVER SITE -- Board activities at the Savannah River Site (SRS) continue to address site-wide programs, including: implementation of Recommendations 94-1 and 94-2, tritium storage and processing, SRS standards-based safety management, and verification of readiness for startup or restart. Major facility-specific activities include the restart of F-Canyon and FB-Line and startup of high level waste processing facilities including the Defense Waste Processing Facility (DWPF) and the In-Tank Precipitation (ITP) facility.

At Savannah River, Recommendation 94-1 involves stabilization of plutonium and transplutonium solutions in F-Canyon, and processing of plutonium metal in storage and of irradiated fuel and target assemblies in storage basins. During FY 1997, the Board intends to monitor these stabilization efforts closely.

Inventories of tritium stored at SRS will continue to increase through 1998. The Board will continue its reviews of storage plans including the loading of Hydride Storage Vessels (HSVs), the storage of loaded HSVs and unloaded reservoirs in Highly Invulnerable Encased Safes (HIVES), and the unloading of tritium reservoirs, focusing on expired reservoirs.

The Board's review of the content and implementation of site-wide Standards/Requirements Identification Documents (S/RIDs), which are scheduled for approval by DOE in early FY 1996 will continue throughout FY 1997, as will its ongoing evaluation of the SRS standards-based safety management program. The latter will start with reviews of hazards analyses, followed by reviews of safety analysis reports and technical safety requirements as they are upgraded for the separations area and the high level waste and tritium facilities.

Recently, Board attention has focused on restart preparations at the F-Canyon and FB-Line facilities, and startup of the In-Tank Precipitation facility (ITP) and the Defense Waste Processing Facility (DWPF). Board oversight of the operation of these facilities will continue in FY 1997.

The Defense Waste Processing Facility (DWPF) is a large vitrification plant designed to convert high-level waste (HLW) into a stable borosilicate glass form. Construction began in 1983, before the facility was completely designed. Detailed design proceeded concurrently with construction through the late 1980's. Since then, additional facility design improvements determined to be either desirable or necessary have been identified and implemented. The plant has not yet operated with radioactive feed material. The chemical processes involved are extremely complex, and are significantly complicated by the presence of HLW and the concomitant need for remote handling of the material. During the last several years, the Board and its staff have emphasized to DOE the importance of providing defense-in-depth in both the design and the operation of the plant. This emphasis has led to improvements in designs and operational modes, in the interest of preventing and mitigating potential accidents. At year-end, DWPF preoperational testing was nearing completion, and DOE had scheduled a comprehensive Operational Readiness Review (ORR) in anticipation of an early 1996 startup. However, the ORR was suspended in late December to give the facility staff additional time to reach a higher state of readiness consistent with DOE requirements. The Board's staff plans to observe the readiness review and assess the results.

In the In-Tank Precipitation (ITP) process, sodium tetraphenylborate (TPB) is used to concentrate and remove radioactive cesium from the waste stream in preparation for processing at the Defense Waste Processing Facility. During the process, chemical and radiolytic decomposition of the TPB occurs, liberating substantial quantities of benzene vapor. This situation creates the potential for a tank deflagration accident that could release large amounts of radioactive materials. Safeguarding against this potential situation has been a major focal point of Board scrutiny. Although several tests and experiments have been performed during the last 13 years, the exact processes which result in the production and liberation of benzene are not well understood. Unexpectedly, the release of benzene is significantly increased by the mixing resulting from operation of the slurry pumps. The resultant concentration of benzene in the vapor space would likely exceed Operational Safety Requirement (OSR) limits during multiple slurry pump operation. This anomalous behavior is being examined assiduously by both the Board and DOE as part of pre-operational preparations.

The Board will continue to review upcoming ITP activities during FY 1997, including Unreviewed Safety Question Determinations associated with postulated benzene production and release mechanisms, testing evolutions, plant modifications, and research.

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE -- During FY 1997, Board activities at Rocky Flats Environmental Technology Site (RFETS) will continue to emphasize site-wide health and safety issues, many of which have arisen as a result of the change in the primary mission of RFETS from a production role to one of preparing for processing and long-term storage of special nuclear materials, residues and plutonium solutions. Much of the plutonium-bearing material at RFETS is not in suitable form for long-term storage and must be processed before it can be safely packaged and stored.

The Board's enabling statute, in a section uniquely applicable to RFETS, requires that the Board specifically determine, prior to any plutonium operations, that the Secretary's response to three of the Board's recommendations (90-2, 90-5, and 91-1) adequately protects public health and safety. In conjunction with this statutorily-mandated safety determination, the Board is also reviewing planned plutonium operations to ensure that they can be performed safely.

Early in 1994, the Board issued Recommendation 94-1, calling for an improved schedule for remediation of plutonium-bearing materials throughout the complex, and specifically recommending that DOE take several actions at RFETS to improve the storage of plutonium-bearing solid and liquid residues at the site. Recommendation 94-1 also recommends that plutonium metal and plutonium oxides be stored in accordance with a new DOE standard for plutonium storage. The Board is monitoring closely DOE's actions in both these areas, particularly as they are being implemented at RFETS.

In Recommendation 94-3, the Board raised the issue of the ability of Building 371 to withstand severe natural phenomena, particularly earthquakes, urging DOE to take a systematic approach for evaluating the building's suitability as a storage facility for consolidation of special nuclear material at the site. That effort is ongoing, and the Board will continue its scrutiny of DOE's progress in its evaluation.

If delays in processing and storage of materials at RFETS occur, the safety issues are likely to become more urgent, particularly those issues involving questions of the stability of solutions and residual materials awaiting processing and others associated with the condition of buildings. The Board will continue to place priority attention on these matters during FY 1997. In addition, DOE's efforts to establish or revise safety authorization bases for specific facilities, many of which have inadequate safety analyses, will be the focus of Board attention.

The Board has assigned two full-time staff members to RFETS to serve as its resident site representatives, providing closer attention to day-to-day site activities. This action is important, not only because of the nature of problems observed, but also because of the recent change in management and operating contractors at RFETS. The full-time presence of Board staff at other sites has proven to be helpful in ensuring timely and effective Board attention to emerging issues. The Board is confident that it will prove to be just as valuable at RFETS.

IDAHO NATIONAL ENGINEERING LABORATORY -- The Board continues to conduct health and safety reviews of operations at the Idaho National Engineering Laboratory (INEL). Safety issues of primary interest to the Board continue to be the timely remediation of corroding spent nuclear fuel at the Idaho Chemical Processing Plant, management of fuel reprocessing wastes, and the continued safe operation of the Advanced Test Reactor.

In the past year, the Board's staff has conducted several reviews of safety issues at the fuel storage basins located in the CPP-603 and CPP-666 facilities. The INEL operating and management contractor has been successful in mitigating the safety problems associated with corroding spent fuel in the CPP-603 fuel storage basins. By July 1995, over 300 fuel handling units had been transferred from CPP-603 to CPP-666, a newer and more structurally sound facility. Transfers of spent fuel from CPP-603 are to continue until the year 2000, when CPP-603 will be empty and decommissioning and decontamination activities are scheduled to commence. The Board intends to continue to monitor these efforts.

Most of the high level radioactive waste stored in tanks at the Idaho Chemical Processing Plant had been processed through the New Waste Calcining Facility by the Fall of 1993. Now, process chemistry modifications are required to stabilize a different type of waste derived from cleaning out the process systems. Methods for processing this "sodium bearing waste" are being explored by DOE and will continue to be the subject of Board reviews. Additionally, the contractor is installing a new evaporator to reduce the volume of high level liquid waste before it is sent to the calciner. DOE plans call for the evaporator to start up in May 1996 and for the calciner to restart in January 1997.

Waste management activities of interest to the Board at the INEL Radioactive Waste Management Complex include handling and characterization of transuranic waste, and the development of a major remediation project. Low level radioactive waste management activities also continue to take place at the Waste Experimental Reduction Facility, where current operations include sizing and compaction of waste and preparations to restart the low level waste incinerator. The Board will continue to monitor operations to assess these activities and the implementation of the Board's Recommendation 94-2 on low level waste management.

In FY 1994, the Board favorably reviewed an integrated systems engineering approach developed by the INEL operating contractor for application at the Idaho Chemical Processing Plant Tank Farm. The Board plans to continue to review the implementation of this study and to review the design, construction, and operation of new facilities, such as the High Level Liquid Waste Evaporator and the New Waste Calcining Facility.

FERNALD SITE -- Over the past four years, the Board has identified several issues at the Fernald Environmental Management Project (FEMP) that could affect public and worker health and safety. Of particular concern were incidents that occurred during attempts to stabilize 200,000 gallons of Uranyl Nitrate Hexahydrate (UNH) solutions. The Board issued Recommendation 93-4 partly as a result of the contractor's lack of readiness to stabilize these solutions safely. Significant progress has since been made by DOE and the contractor, and stabilization of the UNH solutions began in mid-1995.

Significant progress has also been made in processing and removing low-level radioactive materials from the site. Over the past year, the Board's staff made several visits to the site to review various projects, including design and construction of a pilot plant to vitrify uranium processing residues stored in three silos since the early 1950's. The silos contain the largest above ground source of radon-emitting materials in the United States. Pilot plant operations are expected to begin in FY 1996. Construction of a full-scale vitrification plant, with ten times the processing capability of the pilot plant, is planned to begin during FY 1997. The Board intends to review the design and construction of the full-scale vitrification plant.

Future projects planned for FEMP include repackaging of uranium and thorium materials for off-site shipment and the decontamination and decommissioning of site buildings. These programs will require Board oversight in FY 1997 and beyond.

WEST VALLEY SITE -- Construction of a facility to vitrify high-level waste from a nuclear fuel reprocessing plant that previously operated at the West Valley Site was completed in FY 1995 as part of the West Valley Demonstration Project. The facility will be used to convert liquid waste stored on-site to borosilicate glass logs for final disposition in a Federal high-level waste repository. Hot operations, now scheduled to begin next fiscal year, are expected to require approximately two and one-half years to complete.

The Department expects to apply the lessons learned at West Valley to other DOE high-level waste processing facilities. The Board intends to monitor the effectiveness of this technology transfer.

APPENDIX A

STATUTORY MISSION AND BACKGROUND OF THE BOARD

Congress established the Defense Nuclear Facilities Safety Board by Public Law 100-456 on September 29, 1988. The statutory mission of the Board includes the following major functions:

(1) Review and Evaluation of Standards -- The Board shall review and evaluate the content and implementation of the standards relating to the design, construction, operation, and decommissioning of defense nuclear facilities of the Department of Energy (including all applicable DOE Orders, regulations, and requirements) at each Department of Energy defense nuclear facility. The Board shall recommend to the Secretary of Energy those specific measures that should be adopted to ensure that public health and safety are adequately protected. The Board shall include in its Recommendations necessary changes in the content and implementation of such standards, as well as matters on which additional data or additional research is needed.

(2) Investigations -- The Board shall investigate any event or practice at a Department of Energy defense nuclear facility which the Board determines has adversely affected, or may adversely affect, public health and safety.

(3) Analysis of Design and Operational Data -- The Board shall have access to and may systematically analyze design and operational data, including safety analysis reports, from any Department of Energy defense nuclear facility.

(4) Review of Facility Design and Construction -- The Board shall review the design of a new Department of Energy defense nuclear facility before construction of such facility begins and shall recommend to the Secretary, within a reasonable time, such modifications of the design as the Board considers necessary to ensure adequate protection of public health and safety. During the construction of any such facility, the Board shall periodically review and monitor the construction and shall submit to the Secretary, within a reasonable time, such recommendations relating to the construction of that facility as the Board considers necessary to ensure adequate protection of public health and safety. An action of the Board, or a failure to act, under this paragraph may not delay or prevent the Secretary of Energy from carrying out the construction of such a facility.

(5) Recommendations -- The Board shall make such recommendations to the Secretary of Energy with respect to Department of Energy defense nuclear facilities, including the operations of such facilities, standards, and research needs, as the Board determines are necessary to ensure adequate protection of public health and safety. In making its recommendations, the Board shall consider the technical and economic feasibility of implementing the recommended measures.

Created as an independent establishment within the Executive Branch, the Board is made up of five Members appointed from civilian life by the President, by and with the advice and consent of the Senate. The Board's enabling statute requires that the Board Members be respected experts in the field of nuclear safety with demonstrated competence and knowledge relevant to the independent investigation and oversight functions of the Board. The Senate confirmed the first five Board Members on October 19, 1989.

During start-up of Board operations, the Board had trouble hiring individuals with the experience and skill levels needed to carry out the highly technical reviews associated with the Board's work. The National Defense Authorization Act, Fiscal Year 1991, (Public Law 101-510) changed the Board's personnel hiring authority, extending the "excepted service" provisions in the Atomic Energy Act to the Board. This personnel authority, identical to that used by the U.S. Nuclear Regulatory Commission (NRC), has been a decisive factor in enabling the Board to attract and retain technical staff expertise.

Congress enacted several amendments to the Board's enabling legislation as part of the National Defense Authorization Act, Fiscal Years 1992 and 1993 (P.L. 102-190). One change expanded the statutory definition of a "DOE defense nuclear facility" to include facilities and activities involved with the assembly, disassembly, and testing of nuclear weapons, and raised the Board's full-time employment ceiling to 150, an increase of 50 positions. Report language accompanying this legislation urges the Board to expand its activities over environmental restoration and waste management activities, using existing statutory authority.

As provided by statute, the Chairman serves as the chief executive officer of the Board and, subject to such policies as the Board may establish, exercises the functions of the Board with respect to:

- the appointment and supervision of employees of the Board;
- the organization of any administrative units established by the Board; and
- the payment of funds.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

TECHNICAL SUPPORT CONTRACTS

(Status as of 03/15/96)

CONTRACTOR	CONTRACT EXPIRATION DATE	DESCRIPTION OF WORK
Dr. Harold M. Agnew	02/19/97	Provide expertise related to strategic safety issues associated with those facilities involved in the assembly, disassembly, and testing of nuclear weapons, specifically advising the Board in production, dismantlement/disposition, safe handling, testing, and storage of nuclear weapons, nuclear explosive devices, and nuclear weapon components, and the nuclear and hazardous materials used in these items; as well as assisting the Board in understanding the existing involvement of the design laboratories in these activities, and evaluating the sufficiency of current and proposed efforts.
Nicholas P. Armenis	06/02/96	Provide technical expertise to the Board, specifically with respect to the design of nuclear weapons being returned to the Pantex Plant for dismantlement, including historical insight relating to specific design and test details of the weapons systems.
Sanford Cohen & Associates, Inc.	04/08/96	Provide technical support to the Board, specifically involving review and evaluation of DOE's implementation, including that by Management and Operating contractors, of standards related to safety, such as: (1) statutes, orders, and implementation manuals; (2) standards developed outside the DOE community; and (3) other generally

CONTRACTOR	CONTRACT EXPIRATION DATE	DESCRIPTION OF WORK
Sanford Cohen & Associates, Inc.	04/08/96	accepted standards. Review and evaluate (Continued) implementation of standards associated with: chemical process safety; containment and confinement systems; and plutonium storage facilities and systems at defense nuclear facilities.
H&H Consultants, Inc.	09/30/96	Provide technical support to the Board, specifically in the review and evaluation of seismic engineering of structures, systems and components with particular emphasis on: analytical techniques utilized in structural analysis with special emphasis on seismic issues adequacy of various types of analyses performed by DOE contractors; development and relevancy of criteria used in the qualification of DOE facilities; integration of programmatic structural issues from the overall historical prospective; and risk assessment criteria review.
r. W.J. Howard	02/19/96	Provide expertise related to strategic safety issues associated with those facilities involved in the assembly, disassembly, and testing of nuclear weapons, specifically advising the Board in production, dismantlement/disposition, safe handling, testing, and storage of nuclear weapons, nuclear explosive devices, and nuclear weapon components, and the nuclear and hazardous materials used in these items; as well as assisting the Board in understanding the existing involvement of the design laboratories in these activities, and evaluating the sufficiency of current and proposed efforts.
Dr. William E. Kastenberg	12/17/96	Provide assistance in the areas of probabilistic risk assessment and human reliability analysis of defense nuclear operations, specifically involving

CONTRACTOR	CONTRACT EXPIRATION DATE	DESCRIPTION OF WORK
Dr. William E. Kastenberg (Continued)	12/17/96	matters associated with the identification of high risk accidents, prioritization of safety related issues, and development of risk based design criteria for facilities handling special nuclear materials.
Dr. J.A. Leary	12/31/96	Provide technical support to the Board, specifically involving review of operations and nuclear technology at facilities involved in processing and handling of nuclear materials. Examples of recent work include: evaluation of technologies to stabilize plutonium residues, plutonium storage safety issues, and Rocky Flats plutonium stabilization activities.
Dr. James L. Liverman	03/11/97	Provide technical support to the Board in the general subject area of radiation protection, specifically involving review and evaluation of DOE's Implementation Plan for Board Recommendation 91-6 and on other radiological and environmental health and safety issues.
The MITRE Corporation	03/25/96	Provide technical support to the Board involving identification and assessment for adequacy the standards applicable to defense nuclear facilities. Identify applicable standards derived from regulations; DOE Orders and Notices; Requirements Identification Documents (RID's); consensus, national and international standards; and other technical standards affecting DOE's nuclear safety policy. Assess DOE Orders/RID's for adequacy using commercial and consensus standards.
Paul C. Rizzo Associates, Inc.	09/30/96	Provide technical support to the Board, specifically in the review and evaluation of seismic engineering of structures, systems and

CONTRACTOR	CONTRACT EXPIRATION DATE	DESCRIPTION OF WORK
Paul C. Rizzo Associates, Inc. (Continued)	09/30/96	components with particular emphasis on: geotechnical investigation and soil mechanics; systems engineering; seismological hazards; safety analysis; hydrology; and environmental related issues.
Duane C. Sewell	01/09/97	Provide expertise related to strategic safety issues associated with those facilities involved in the assembly, disassembly, and testing of nuclear weapons, specifically advising the Board in production, dismantlement/disposition, safe handling, testing, and storage of nuclear weapons, nuclear explosive devices, and nuclear weapon components, and the nuclear and hazardous materials used in these items; as well as assisting the Board in understanding the existing involvement of the design laboratories in these activities, and evaluating the sufficiency of current and proposed efforts.
D. Stevenson, Consulting gineer	09/30/97	Provide technical support to the Board, specifically in the review and evaluation of seismic engineering of structures, systems and components with particular emphasis on: (1) the applicability and content of orders and standards developed by DOE and its contractors as well as existing codes and standards used at DOE facilities; (2) the applicability of commercial nuclear regulations as they apply to DOE facilities; (3) quality assurance related matters; (4) Probabilistic Risk Assessment related matters; and (5) hazard classification.
System Planning Corporation	01/31/97	Provide technical support to the Board, specifically involving evaluation of standards and operations and maintenance activities at defense nuclear facilities, including training and qualification programs for technical personnel.

CONTRACTOR	CONTRACT EXPIRATION DATE	DESCRIPTION OF WORK
System Planning Corporation (Continued)	01/31/97	Recent work has included, for example, assessing nuclear weapons disassembly operations at the Pantex Plant and interviewing Pantex production technicians to assess their fundamental knowledge level on nuclear explosive safety, radiation hazards, and conduct of operations.
Dr. Gerald Tape	11/30/96	Provide expertise related to strategic safety issues associated with those facilities involved in the assembly, disassembly, and testing of nuclear weapons, specifically advising the Board in production, dismantlement/disposition, safe handling, testing, and storage of nuclear weapons, nuclear explosive devices, and nuclear weapon components, and the nuclear and hazardous materials used in these items; as well as assisting the Board in understanding the existing involvement of the design laboratories in these current and proposed efforts.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD
1995 RECOMMENDATIONS CALENDAR

3/13/96 Update

DNFSB Recommendation Number, DOE Site Involved And Subject In Brief	Date Delivered To Sec'y Of DOE	Date Recomme. Appears In Fed. Register	Public Comments To Rec. Deadline Date	Sec'y Of DOE Response Due Date	Date Sec'y Of DOE Response Received	Date Response Appears In Fed. Register	Deadline For Public Comments To SOE Response	Implementation Plan Due Date	Date Implementation Plan Received
95-1 All Sites Safety of Cylin. w/ Depl. Uranium	05/05/95	05/15/95	06/14/95	06/29/95	07/05/95	07/18/95	08/17/95	10/16/95	1/ 10/17/95
95-2 All Sites Safety Management	10/11/95	10/19/95	10/20/95	2/ 01/17/96	01/18/96	01/23/96	01/22/96	04/22/96	

1/ 11/1/95 Board sent letter to SOE accepting Implementation Plan.
2/ 12/1/95 SOE requested a 45-day extension for response, Board approved 12/5/95.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD
1994 RECOMMENDATIONS CALENDAR

3/13/96 Update

DNFSB Recommendation Number, DOE Site Involved And Subject In Brief	Date Delivered To Sec'y Of DOE	Date Recomme. Appears In Fed. Register	Public Comments To Rec. Deadline Date	Sec'y Of DOE Response Due Date	Date Sec'y Of DOE Response Received	Date Response Appears In Fed. Register	Deadline For Public Comments To SOE Response	Implementation Plan Due Date	Date Implementation Plan Received
94-1 All Sites Improved Sched. for Remediation	05/26/94	06/03/94	07/05/94	1/ 09/01/94	08/31/94	09/06/94	10/06/94	2/ 02/28/95	2/ 03/01/95
94-2 All Sites Low-Level Waste Disposal	09/08/94	09/15/94	10/17/94	10/31/94	11/08/94	11/16/94	12/16/94	3/ 03/31/95	04/10/95
94-3 Rocky Flats Seismic and Safety Systems	09/26/94	10/04/94	11/03/94	11/18/94	11/21/94	11/28/94	12/28/94	4/ 04/12/95	6/ 07/03/95
94-4 Oak Ridge Deficiencies in Criticality Saf.	09/27/94	10/05/94	11/04/94	11/21/94	11/18/94	11/28/94	12/28/94	02/27/95	02/27/95
94-5 All Sites Integ. of Safety Rules, Orders	12/29/94	01/06/95	02/06/95	02/21/95	02/23/95	03/07/95	04/06/95	5/ 07/20/95	07/25/95

1/ Response originally due 7/18/94, SOE requested 45-day extension.
2/ IP initially due 12/5/94, rec'd 12/6/94; orig. IP withdrawn 1/26/95, will be resubmitted by 2/28/95; 2/28/95 IP is acceptable with three conditions.
3/ Implementation Plan originally due 2/14/94, SOE notified Board that DOE needed an additional 45 days.
4/ Implementation Plan originally due 2/27/95, SOE notified Board that DOE needed an additional 45 days.
5/ Implementation Plan originally due 6/5/95, SOE notified Board that DOE needed an additional 45 days.
6/ 10/3/95 letter to SOE stating Board accepts IP with revised schedule for Phase I.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD
1993 RECOMMENDATIONS CALENDAR

3/13/96 Update

DNFSB Recommendation Number, DOE Site Involved And Subject In Brief	Date Delivered To Sec'y Of DOE	Date Recomme. Appears In Fed. Register	Public Comments To Rec. Deadline Date	Sec'y Of DOE Response Due Date	Date Sec'y Of DOE Response Received	Date Response Appears In Fed. Register	Deadline For Public Comments To SOE Response	Implementation Plan Due Date	Date Implementation Plan Received
93-1 All Sites, Standards Utilization	01/21/93	01/28/93	03/01/93	1/ 04/28/93	04/27/93	05/10/93	06/09/93	08/09/93	2/ 08/25/93
93-2 All Sites, Critical Experiment Capability	03/23/93	03/30/93	04/29/93	05/14/93	05/13/93	06/04/93	07/06/93	09/02/93	08/10/93
93-3 All Sites, Tech. Capability in DNF Programs	06/01/93	06/08/93	07/08/93	07/23/93	07/23/93	08/06/93	09/06/93	11/04/93	3/ 11/04/93
93-4 All Sites, Env. Restoration Mgmt. Contracts	06/16/93	06/24/93	07/26/93	08/09/93	08/09/93	08/12/93	09/13/93	11/10/93	5/ 11/09/93
93-5 Hanford, Waste Tanks Char. Studies	07/19/93	07/28/93	08/27/93	09/13/93	08/31/93	09/09/93	10/11/93	4/ 01/24/94	01/25/94
93-6 All Sites, Maintaining Acc. to Nuc.Wea.Exp.	12/10/93	12/23/93	01/24/94	02/07/94	02/04/94	02/17/94	03/22/94	6/ 07/05/94	07/08/94

1/ 45-day extension requested by DOE; Board approved 3/23/93.
2/ Original Implementation Plan received 7/19/93; received amended IP that includes requested Board additions on 8/25/93.
3/ Implementation Plan also covered revised IP for Recommendation 92-7.
4/ Implementation Plan originally due 12/8/93, 12/14/93 received letter (dated 12/9/93) notifying that DOE needed a 45-day extension.
5/ 5/16/94 DOE notified Board that Item 4 of Recommendation is closed; 10/4/95 Board issued report requirement for revised IP.
6/ Implementation Plan originally due 5/18/94, 5/19/94 received letter from SOE notifying Board that DOE needed 45-day extension.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD
1992 RECOMMENDATIONS CALENDAR

3/13/96 Update

DNFSB Recommendation Number, DOE Site Involved And Subject In Brief	Date Delivered To Sec'y Of DOE	Date Recomme. Appears In Fed. Register	Public Comments To Rec. Deadline Date	Sec'y Of DOE Response Due Date	Date Sec'y Of DOE Response Received	Date Response Appears In Fed. Register	Deadline For Public Comments To SOE Response	Implementation Plan Due Date	Date Implementation Plan Received
92-1 Savannah River, HB-Line Oper. Readiness	05/21/92	05/29/92	06/29/92	1/ 10/14/92	10/20/92	11/06/92	12/07/92	**CLOSED 10/27/92**	**SUPER-SEDED BY REC.92-3**
92-2 All Sites, DOE Facility Rep. Program	05/28/92	06/04/92	07/06/92	07/20/92	07/21/92	07/31/92	08/31/92	10/29/92	6/ 11/05/92
92-3 Savannah River, HB-Line Op. Read. Review	05/29/92	06/04/92	07/06/92	2/ 09/03/92	2/ 09/21/92	10/16/92	11/16/92	11/30/92	2/ 09/21/92 **CLOSED**
92-4 Hanford, Multi-Function Waste Tank Fac.	07/06/92	07/14/92	08/13/92	08/28/92	08/28/92	09/23/92	10/23/92	5/ 02/05/93	7/ 11/07/94
92-5 All Sites, Discipline of Operation	08/17/92	08/28/92	09/28/92	3/ 11/27/92	3/ 12/18/92	01/08/93	02/08/93	04/08/93	3/ 12/18/92 **CLOSED**
92-6 All Sites, Operational Readiness Review	08/26/92	09/02/92	10/02/92	10/19/92	10/20/92	11/06/92	12/07/92	02/04/93	8/ 04/04/94 **CLOSED**
92-7 All Sites, Training and Qualification	09/22/92	09/28/92	10/28/92	4/ 12/28/92	01/21/93	01/28/93	03/01/93	4/ 06/14/93	9/ 11/04/93

1/ 45-day extension requested, Board approved on 7/17/92; DOE response to be sent within 30 days of receipt of DNFSB HB Line report, which was delivered 9/14/92
2/ 45-day extension requested for response, Board approved 7/17/92; DOE response dated 9/15/92 and received 9/21/92. Implementation Plan was included; Recommendation closed per 2/94 Annual Report.
3/ 45-day extension requested for response, Board approved 10/23/92; DOE response and Implementation Plan received together; recommendation closed per 10/24/95 letter to SOE.
4/ 45-day extension requested for response, Board approved 12/2/92; 4/28/92 received DOE notice of 45 day extension for submitting Implementation Plan.
5/ Received DOE notice of 45-day extension for submitting Implementation Plan.
6/ 1/15/93 Board letter to SOE stating Implementation Plan be revised.
7/ Original Implementation Plan received 2/4/93; Due to deficiencies, DOE has submitted revisions on 3/18 94 and 11/7/94.
8/ Original Implementation Plan received 1/19/93; Received revised IP 9/17/93; Received revised IP 4/4/94, dated 4/1/94; recommendation closed per 10/24/95 letter to SOE.
9/ Original Implementation Plan received 6/14/93; Received revised IP 11/4/93 that also covered IP for Recommendation 93 3; Recommendation closed per 2/94 Annual Report

DEFENSE NUCLEAR FACILITIES SAFETY BOARD
1991 RECOMMENDATIONS CALENDAR

3/13/96 Update

DNFSB Recommendation Number, DOE Site Involved And Subject In Brief	Date Delivered To Sec'y Of DOE	Date Recomme. Appears In Fed. Register	Public Comments To Rec. Deadline Date	Sec'y Of DOE Response Due Date	Date Response Appears In Fed. Register	Deadline For Public Comments To SOE Response	Implementation Plan Due Date	Date Implementation Plan Is Received	Public Hearing Date
91-1 All Sites Safety Standards	03/08/91	03/13/91	04/12/91	1/ 05/13/91	05/17/91	06/17/91	08/15/91	08/16/91	**CLOSED 10/27/92**
91-2 Savannah River, Narrative For Closure Pkg.	03/27/91	04/03/91	05/03/91	2/ 05/20/91	05/28/91	06/27/91	08/26/91	08/07/91	**CLOSED 10/27/92**
91-3 WIPP Readiness Review	04/25/91	05/01/91	05/31/91	3/ 06/17/91	3/ 07/24/91	08/23/91	3/ 09/03/91	08/07/91	**CLOSED 05/01/92**
91-4 Rocky Flats Operational Readiness Review	09/30/91	10/08/91	11/07/91	4/ 11/22/91	12/10/91	01/09/92	02/20/92	11/08/91	**01/16/92 CLOSED 05/01/92**
91-5 Savannah River, Power Limits/K-Reactor	12/19/91	12/27/91	01/27/92	5/ 02/10/92	03/10/92	04/09/92	06/08/92	5/ 01/31/92	**CLOSED 02/94 ANN.RPT.**
91-6 All Sites Radiation Protection	12/19/91	12/27/91	01/27/92	6/ 02/10/92	03/10/92	04/09/92	06/08/92	7/ 06/23/93	

1/ Originally DOE response due 4/29/91; Deputy SOE requested an extension to 5/13/91. Board approved 4/29/91.
2/ SOE response letter dated 5/14/91 and received 5/24/91.
3/ SOE response letter dated and received 6/5/91; Implementation Plan due date determined from date response was received.
4/ SOE response letter dated 11/6/91 and received 11/8/91.
5/ SOE response letter dated and received 1/31/92; response includes Implementation Plan.
6/ SOE response letter dated 2/7/92 and received 2/11/92.
7/ Per 8/5/92 letter to SOE, Implementation Plan not accepted; 1/15/93 DOE submitted revised Plan; 6/23/93 received Revision 2 Implementation Plan, dated 6/21/93; 7/2/93 letter to SOE stating Revision 2 IP was acceptable if implementation dates were revised; 5/10/94 received letter from SOE stating implementation dates were adjusted.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD
1990 RECOMMENDATIONS CALENDAR

3/13/96 Update

DNFSB Recommendation Number, DOE Site Involved And Subject In Brief	Date Delivered To Sec'y Of DOE	Date Recomme. Appears In Fed. Register	Public Comments To Rec. Deadline Date	Sec'y Of DOE Response Due Date	Date Response Appears In Fed. Register	Deadline For Public Comments To SOE Response	Implementation Plan Due Date	Date Implementation Plan Is Received	Public Hearing Date
90-1 Savannah River, Reactor Operator Trng.	02/22/90	03/01/90	03/31/90	04/15/90	04/13/90	05/14/90	07/12/90	3/ 07/13/90	06/28/90 **CLOSED** **10/27/92**
90-2 All Sites Standards	03/08/90	03/14/90	04/13/90	1/ 06/12/90	06/12/90	07/12/90	09/10/90	6/ 11/09/94	**CLOSED**9/ 08/30/90
90-3 Hanford Future Tank Monitoring	03/27/90	03/30/90	04/30/90	05/14/90	05/23/90	06/22/90	2/ 08/13/90	08/13/90	**CLOSED** **05/01/92**
90-4 Rocky Flats Operational Readiness Review	05/04/90	05/10/90	06/11/90	06/25/90	06/25/90	07/25/90	09/24/90	4/ 11/30/90	08/30/90
90-5 Rocky Flats Systematic Evaluation Program	05/18/90	05/24/90	06/25/90	07/09/90	06/20/90	07/20/90	09/18/90	7/ 05/04/94	10/ 08/30/90 **CLOSED**
90-6 Rocky Flats Plutonium In The Ducts	06/05/90	06/11/90	07/11/90	07/26/90	07/26/90	08/27/90	10/24/90	11/30/90	11/ 08/30/90 **CLOSED**
90-7 Hanford Modif. To Imple. Plan For 90-3	10/12/90	10/18/90	11/19/90	12/03/90	12/11/90	01/10/91	5/ 03/04/91	8/ 10/00/94	

1/ Secretary's response originally due 4/25/90; Board granted 45-day extension to 6/12/90.
2/ Implementation Plan due day figured from 5/14/90.
3/ Original Implementation Plan received 7/13/90; supplemental received 2/7/91 to rectify deficiencies.
4/ Original Implementation Plan received 11/30/90; modification received 2/15/91 to incorporate revisions and changes cited by Board.
5/ Implementation Plan due date figured from 12/3/90.
6/ Original Implementation Plan received 9/17/90; due to deficiencies, DOE has submitted revisions on 11/14/91, 6/15/92, 12/24/92, 7/20/93, and 11/9/94.
7/ 5/27/93 letter to SOE requesting revised IP; 6/25/93 SOE responded, will provide rev. by 10/15/93; rev. 1 IP received 10/15/93; 12/20/93 letter to SOE requesting IP be rev.; 5/4/94 received Rev. 2 IP.
8/ Original Implementation Plan received 3/7/91; Revision 1, dated 12/92, received 9/2/93; 5/10/94 received WHC-EP-0721 Program Plan as a replacement to IP; 12/2/94 received DOE/RL-94-110 as updated IP.
9/ Recommendation closed per 10/24/95 letter to SOE.
10/ Recommendation closed per 10/24/95 letter to SOE.
11/ Recommendation closed per 10/24/95 letter to SOE.

Overall DNFSB Resource Use By Major Site

	FY 95 (Actual)		FY 96 (Planned)		FY 97 (Request)	
	Technical Staff FTEs	Contractor Oblig. $K	Technical Staff FTEs	Contractor Oblig. $K	Technical Staff FTEs	Contractor Oblig. $K
Hanford	9	176	10	160	11	160
RFP	7	580	10	550	12	400
SRS	9	575	5	400	5	250
LANL, LLNL, NTS*	8	140	4	20	4	20
Pantex	6	334	10	250	10	200
Oak Ridge Y-12	5	380	6	200	6	100
FEMP, WIPP, INEL ***	4	30	2	20	2	20
Complex-Wide**	9	1,235	13	1,000	12	850
Totals	**57**	**3,450**	**60**	**2,600**	**62**	**2,000**

* Los Alamos National Lab, Lawrence Livermore National Lab, Sandia National Lab, Nevada Test Site.

** Complex-Wide efforts include, but are not limited to, review and evaluation of DOE implementation of Board recommendations that have complex-wide impacts (e.g., 90-2, 93-3, 93-6, and 94-1), evaluation of the DOE standards development, and DOE complex-wide assessments such as DOE staffing and organization effectiveness, emergency response network effectiveness, occurrence reporting evaluations, and evaluations of DOE's technical competence.

*** Fernald Environmental Management Project; Waste Isolation Pilot Plant; Idaho National Engineering Lab.

Overall DNFSB Resource Use By Technical Review Area

	FY 95 (Actual)		FY 96 (Planned)		FY 97 (Request)	
	Technical Staff FTEs	Contractor Oblig. $K	Technical Staff FTEs	Contractor Oblig. $K	Technical Staff FTEs	Contractor Oblig. $K
Operations	10	971	7	760	7	605
Rad Protection	5	291	5	190	5	160
Standards	6	663	6	610	6	470
Mech. Engineering	14	206	13	190	13	170
Structural/Sys. Eng.	3	823	3	540	3	370
Safety Eng.	5	206	7	120	8	65
Nuc. Process Eng.	7	291	7	190	8	160
Elec./I&C Eng.	4	0	4	0	4	0
Site Reps.	3	0	8	0	8	0
Totals	**57**	**3,450**	**60**	**2,600**	**62**	**2,000**

SIXTH ANNUAL REPORT

TO CONGRESS

DEFENSE NUCLEAR FACILITIES
SAFETY BOARD

MARCH 1996

John T. Conway, Chairman
A.J. Eggenberger, Vice Chairman
John W. Crawford, Jr.
Joseph J. DiNunno
Herbert John Cecil Kouts

**DEFENSE NUCLEAR FACILITIES
SAFETY BOARD**

625 Indiana Avenue, NW, Suite 700, Washington, D.C. 20004
(202) 208-6400

March 25, 1996

To the Congress of the United States:

The Defense Nuclear Facilities Safety Board (Board) is pleased to submit to the Congress its sixth annual report for calendar year 1995. The Board is an independent executive branch establishment responsible for providing advice and recommendations to the President and the Secretary of Energy regarding public health and safety issues at Department of Energy (DOE) defense nuclear facilities. The Board also reviews and evaluates the content and implementation of health and safety standards, as well as other requirements, relating to the design, construction, operation, and decommissioning of DOE defense nuclear facilities.

As required by statute, the Board's report summarizes activities during calendar year 1995, assesses improvements in the safety of DOE defense nuclear facilities, and identifies remaining safety problems.

Since our last report, the Secretary of Energy has received the report of a committee appointed by her to provide advice concerning the feasibility of external regulation of DOE's nuclear safety program. Inasmuch as the Board is identified in the committee's report as a possible base for external regulation of this portion of DOE's activities, the Board's report also responds to the committee's recommendations, in addition to the information required by the Board's enabling statute.

Respectfully submitted,

A.J. Eggenberger
A.J. Eggenberger
Vice-Chairman

John T. Conway
John T. Conway
Chairman

John W. Crawford, Jr.
John W. Crawford, Jr.
Member

Herbert Kouts
Herbert J.C. Kouts
Member

Joseph J. DiNunno
Joseph J. DiNunno
Member

REPORT TO CONGRESS ON BOARD ACTIVITIES RELATED TO HEALTH AND SAFETY DURING 1995

I. INTRODUCTION

A. BACKGROUND

Beginning in the early days of World War II and continuing to the present, the Department of Energy (DOE) and its predecessor agencies, the Atomic Energy Commission and the Energy Research and Development Administration, produced special nuclear materials and designed, manufactured, tested, and maintained the weapons in the nation's nuclear arsenal. During most of that period, the defense nuclear weapons complex operated without independent external oversight. In the late 1980's, however, increasing awareness of the accumulating public health and safety issues involving many of the aging defense nuclear facilities led Congress to pass a law in 1988 to create the Defense Nuclear Facilities Safety Board (Board). The Board, which came into existence in 1989, a year later, is an independent technical oversight organization within the Executive Branch, chartered to provide advice and recommendations to the Secretary of Energy to ensure adequate protection of public and worker health and safety at DOE's defense nuclear facilities.

The Board is responsible for independent oversight of all activities relating to nuclear safety within DOE's nuclear weapons complex. Many of these activities are now associated with cleanup of extensive radioactive contamination resulting from decades of production operation. DOE is actively engaged in the ongoing process of disassembling nuclear weapons, maintaining the remaining weapons in the stockpile in a safe and reliable condition, and conducting research focused on ensuring the continued stewardship of the stockpile. In addition, considerable attention is currently being devoted to safe storage of fissionable material removed from disassembled weapons and of material remaining in the system following the abrupt cessation of many production activities more than seven years ago.

By law, the Board is required to review and analyze facility and system design, operations, practices, and events, and make recommendations to the Secretary of Energy that are necessary to ensure adequate protection of public health and safety. The Board must consider the technical and economic feasibility of implementing the recommended measures, and the Secretary must report to the President and Congress if implementation of a recommendation is impracticable because of budgetary considerations. If the Board determines that an imminent or severe threat to public health or safety exists, the Board is required to transmit its recommendations to the President, as well as to the Secretaries of Energy and Defense.

The enabling statute, 42 U.S.C. § 2286 *et seq.*, requires the Board to review and evaluate the content and implementation of health and safety standards, including DOE's orders, rules, and other safety requirements pertaining to the design, construction, operation, and decommissioning of DOE's defense nuclear facilities. The Board must then recommend to the Secretary of Energy any specific measures, such as changes in the content and implementation of those standards that the Board believes should be adopted to ensure that the public health and safety are adequately protected. The Board also is required to review the design of new defense nuclear facilities before their construction begins, as well as modifications to older facilities, and to recommend necessary changes. Review and advisory responsibilities of the Board continue throughout the full life cycle of facilities, including shutdown and decommissioning phases.

The Board may conduct investigations, issue subpoenas, hold public hearings, gather information, conduct studies, establish reporting requirements for DOE, and take other actions in furtherance of its review. These ancillary functions of the Board relate to the accomplishment of the Board's primary function, which is to assist DOE in identifying and correcting health and safety problems at defense nuclear facilities. The Department of Energy and its contractors at defense nuclear facilities are required to cooperate fully with the Board.

The terms of the statute setting up the Board gave clear guidance of what Congress had in mind for the Board to do, and the way it was to operate. Oversight with action-forcing powers was chosen instead of making the Board a regulator. Congress expected the Board's oversight to have many of the same positive results as regulation; that is, assure that DOE was implementing a program for the safe management of the production and use of defense nuclear materials, a program that provides reasonable assurance of no undue risk to the workers and the public, and protects the environment. Congress was well aware that DOE had issued safety policies and standards of good practices. However, Congress was also aware that they needed upgrading and that DOE and contractor operations in the past had left a residual of much contamination in buildings and the surrounding environment. DOE's problem appeared to be more one of failure by DOE to establish clear expectations of its contractors and to build safety compliance into the fabric of work planning and execution.

The Board's efforts in the past six years have been focused upon the examination of the standards identified by DOE as codes of good practices, the manner in which DOE defines for its contractors what is expected of them in the performance of DOE's mission, and how such expectations once established as requirements are enforced. These elements are basic to any safety management program whether internally or externally driven. The most significant deficiencies noted by the Board in these basic elements have been communicated to DOE via the recommendation process set forth in our authorizing legislation. These recommendations not only describe the perceived deficiency, but also provide guidance as to what the Board believes is advisable for a solution. Details of plans for addressing the issues identified through the recommendation process are then submitted by the Secretary for Board approval. The Board follows the progress of the required action program until the planned action has been completed.

To date the Board has issued 33 sets of recommendations containing 147 specific recommendations. These will be discussed in more detail later.

Not all Board action-forcing activities lead to formal recommendations. The Board's assigned functions also include the review of design, construction, operation, and decommissioning of defense nuclear facilities. For such activities the Board's charter allows it to satisfy a real need for DOE to get on with its work with a minimum of delay due to external oversight. The Board, through assignment of its staff to monitor and review work, whether it is design, construction or readiness preparations for operations, has been able to keep its reviews synchronized with DOE activities. Technical concerns that arise are frequently resolved by the technical staffs of DOE, the Board, and contractors without the need for action-forcing measures by the Board. If the Board determines there are unresolved safety issues that require resolution before proceeding, the Board can define the issue for the Secretary and recommend resolution before proceeding. In the case of operations at the Rocky Flats Environmental Technology Site, Congress specifically required the Board to certify safety of readiness before resumption of operations could begin.

In addition to its reviews of the basic elements and structure of DOE's safety management program, the Board has given priority attention to facilities and activities believed to represent the greatest safety risks – mainly those that now comprise the residual of the nuclear weapons complex devoted to stewardship, maintenance and surveillance of nuclear weapons, the storage of strategic and highly radioactive materials and the stabilization of hazardous residuals of weapons production. For those facilities and operations representing significant hazards (e.g., those classified as hazard classes 1 and 2), the Board is pressing DOE to develop safety management programs that result in clearly defined systems and components important to safety, the technical specifications that define limiting conditions for operation, and the infrastructure needed to support maintenance and safety in operation. This has already been done in a number of cases. The extension of this effort to all high-risk facilities is the thrust of the Board's Recommendation 95-2. The end goal is to have safety management programs that are well defined but tailored to the diverse operations that make up the DOE complex, the hazards-specific nature of the activities involved and the aged nature of the facilities in which such operations must be conducted.

With respect to decommissioning of defense nuclear facilities, the Board has tended to focus its activities on those facilities in transition to cleanup or environmental restoration under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA). A substantial number of such facilities require considerable effort to remove radioactive materials, or otherwise deactivate them, before they can be considered safe for non-time critical[1] remedial action. CERCLA and RCRA statutes are administered by the Environmental Protection Agency (EPA) and the States. The Board is working cooperatively with EPA and the States to by DOE effect this transition smoothly. The Board has recently signed a cooperative agreement with the State of Colorado, EPA, and DOE with respect to activities at the Rocky Flats Environmental Technology Site (RFETS).

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[1] Non-time critical remedial action is action which can be deferred temporarily, but which should be completed at the first reasonable opportunity.

The Board is required by statute to report to Congress each year concerning its oversight activities, its recommendations to the Secretary of Energy, and improvements in safety achieved at defense nuclear facilities as a result of its activities. This report addresses that requirement.

B. REPRESENTATIVE ACCOMPLISHMENTS IN 1995 ARISING FROM BOARD ACTIONS

During 1995, a number of Board initiatives, some undertaken in previous years, were completed or advanced significantly. A representative sample of these accomplishments is summarized below. These, as well as others, are discussed further in later sections of this report.

- The Board issued a landmark recommendation urging DOE to improve the process used in development, review, and approval of documentation for methods to be used in ensuring safety (Authorization Bases) for facility operation or conduct of potentially hazardous activities, based on two technical reports prepared by the Board (Recommendation 95-2).

- Based on the guidance contained in the technical reports[2] supporting Recommendation 95-2, the Board had its staff complete assessments of authorization bases for a representative sample of high priority defense nuclear facilities and activities, demonstrating the soundness and adaptability of the concepts included in the reports and setting the groundwork for future reviews of authorization bases prepared by DOE and its contractors.

- In response to Recommendation 94-1, plutonium residues remaining from metal casting at the RFETS were successfully stabilized during the summer of 1995, and by mid-November 1995, all plutonium in contact with plastic had been repackaged.
- Also in response to Recommendation 94-1 and a Board technical report, DOE changed its previous plans for dry storage of deteriorating reactor fuel in storage basins at the Savannah River Site and is now planning to stabilize the fuel by processing it in F-Canyon.

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[2] *Fundamentals for Understanding Standards-Based Safety Management of Department of Energy Defense Nuclear Facilities*, DNFSB/TECH-5; and *Safety Management and Conduct of Operations at the Department of Energy's Defense Nuclear Facilities*, DNFSB/TECH-6.

- Largely as a result of the Board's attention to the problems associated with deteriorating fuel at the Hanford Site, the K Basins now have in place most of the elements of an adequate authorization basis[3], including an updated Safety Analysis Report, revised Operational Safety Requirements, a corresponding Safety Evaluation Report prepared by DOE, a Standards/Requirements Identification Document (S/RID), and revised facility procedures.

- As a result of Board emphasis on the need for comprehensive readiness reviews, substantial improvements were made in systems and practices at the F-Canyon and FB-Line at the Savannah River Site, leading to the timely availability of these facilities for stabilization of plutonium solutions.

- In early 1995, the Board issued Recommendation 95-1 after its staff found that many cylinders containing depleted uranium hexafluoride in outdoor storage at the three gaseous diffusion plants were handled and stored under conditions that could lead to high deterioration rates. As a result, DOE initiated a program for repairing the affected cylinders and for improving storage conditions.

- Spurred by Recommendation 90-7, DOE produced credible evidence during 1995 that the previously suspected accumulation of potentially explosive concentrations of ferrocyanide compounds in waste tanks at the Hanford Site had been mitigated by degradation of any such compounds to the point that they are now present in relatively harmless concentrations.

- Due in large part to the Board's intensive review, agreements between DOE and the Federal Aviation Administration (FAA) have been reached that will eventually eliminate most aircraft flights over the Pantex Plant, where nuclear weapons are dismantled, thereby significantly reducing the risk of an airplane crash into the Plant.

- Board attention to technical staffing of DOE's Amarillo Area Office and the Y-12 Site Office at Oak Ridge led to the hiring of technically competent engineering professionals in Amarillo and new technical staff members in the Y-12 Site Office, yielding substantial improvements in operations at both locations.

- In response to Recommendation 94-4, DOE took immediate steps to correct safety deficiencies at the Y-12 Plant at Oak Ridge and then validated the corrections through a formal restart process.

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[3] DOE Order 5480.21 defines "authorization basis" as: "Those aspects of facility design basis and operational requirements relied upon by DOE to authorize operation."

- The Board's staff played a substantial role in helping prepare a needed standard for storing highly enriched uranium at the Y-12 Plant at Oak Ridge. None had existed prior to the summer of 1995.

- In response to an earlier Recommendation (92-6), which called for improved guidance for timing, staffing and content of operational readiness reviews, DOE had developed a new order and a new DOE standard. Both were revised in 1995 to respond to a number of Board comments suggesting improvements in both documents.

II. MAJOR TECHNICAL ACTIVITIES OF THE BOARD DURING 1995

A. HEALTH AND SAFETY MANAGEMENT OF DEFENSE NUCLEAR FACILITIES - COMPLEX-WIDE ISSUES

Review of DOE Proposed Safety Rules and Revised Orders and Standards

In its enabling statute, 42 U.S.C. § 2286 *et seq.*, the Board is assigned responsibility for review and evaluation of " . . . the content and implementation of the standards relating to the design, construction, operation, and decommissioning of defense nuclear facilities of the Department of Energy (including all applicable Department of Energy orders, regulations, and requirements) at each Department of Energy defense nuclear facility." In addition to those imposed by statute, DOE sets requirements for its employees and contractors through one or more of the following vehicles:

- Rules incorporated in the Code of Federal Regulations;

- DOE Safety orders or S/RID's[4] for specific subject areas, incorporating specific requirements, such as standards; or

- Standards established by the American National Standards Institute (ANSI), by other recognized standards-writing bodies (such as technical or professional societies or associations), or by DOE, when incorporated into contracts or into the Code of Federal Regulations.

DOE's rules, orders, and regulations can be supplemented by "guidance documents" that present acceptable methods for meeting requirements established in one of the above forms.

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[4] DOE safety orders or S/RIDs, in themselves, do not impose enforceable requirements on DOE contractors, but become enforceable when they are invoked by specific contract provisions, which are legally binding (See *Fundamentals for Understanding Standards-Based Safety Management of Department of Energy Defense Nuclear Facilities*, DNFSB/TECH-5).

This guidance may include a recognized industry standard, an accepted industry practice, or an internal DOE standard.

This compendium can be viewed as depicting a hierarchy of established good practices that exist in three tiers. The first tier contains the statutes, rules and other regulations that can be viewed as non-discretionary. The second tier contains DOE safety orders and standards that can be seen as discretionary until their applicability is established by contract. The third tier of the hierarchy contains the DOE "how-to" safety and implementation guides.

Whereas selected practices contained within the first two tiers become requirements by law or contract, the guidance contained within the third tier is viewed by DOE to be "optional" and is briefly described below.

The DOE safety and implementation guides describe acceptable methods that the contractor may implement in order to meet specific requirements. DOE has stated that the contractor is not required to use these methods and may propose alternative implementation methods for DOE's approval, as long as there is technical justification that an adequate level of safety, commensurate with the hazard, is achieved. In this context, the methods described in the DOE safety and implementation guides are termed "optional."

It is from this fabric of recognized good practices that safety management programs are tailored to fit the specifics of the work to be done.

During the past several years, DOE has revised, improved, and upgraded some requirements in response to many factors, including not only Board Recommendations, but also DOE and contractor initiatives and a general recognition of the importance of safety standards and requirements in establishing an effective safety management program.

During 1995, DOE initiated a major "Order/Requirement Reduction and Streamlining" effort to overhaul the requirements it had developed and used for years, motivated by a number of influences, both internal and external. The scope of this effort includes substantial revisions of requirements covering administrative, procurement and technical aspects of how the Department does its business. These are set forth in a small number of rules and in hundreds of DOE orders pertaining to the broad spectrum of DOE's responsibilities. This DOE undertaking involved large commitments of the Department's technical, administrative, and legal staff resources. Of the many hundreds of orders, fifty-one (51) are related to nuclear safety matters for which the Board has oversight responsibilities.

From its inception, DOE's Order/Requirement revision effort has been closely monitored by the Board, as that effort applied to the 51 orders of interest to the Board. After reviewing initial drafts of order changes and proposed rules under this effort, the Board observed that extensive deletions of many good practices now captured as safety requirements were being considered by DOE. That possibility led the Board to have its staff and its outside experts review in detail the 51 safety-related orders and DOE's implementation of those orders in the field. Based on that review effort, the Board determined that much of the requirements and guidance in most of the 51 safety-related orders should be retained. The Board also found that substantial improvement was needed in some of the existing orders[5]. On the other hand, it appeared that DOE 5480.18B, *Nuclear Facility Training Accreditation Program*, might be unnecessary for low hazard facilities, provided DOE 5480.20A, *Personnel Selection, Training and Qualification Requirements for DOE Nuclear Facilities*, was rigorously implemented.

By year's end, the Board and its staff were extensively engaged in reviewing DOE's Order/Requirement Reduction Effort, providing detailed technical comments and requesting DOE to provide justification for changes to nuclear safety requirements being contemplated in the "new" series of orders and proposed rules. The Board and its staff called to DOE's attention inadequacies in the new orders/rules and in the technical justifications developed to support these requirement changes. The Board observed that in carrying out this effort, DOE has set aside or is making discretionary or optional many well-established safety practices, thus rendering the affected orders deficient.

Numerous technical meetings with DOE's staff have been held during the past year to review and discuss the technical merits of the proposed changes. In July 1995, after a four-month review period, the Board held a public meeting on DOE's "new" order/rule process, and in September, a second public meeting on the subject was held to examine some of the issues remaining at that time. During these meetings, the Board's staff testified that the requirements in some of the proposed rules or draft orders, when analyzed together with their associated guidance, do not represent, in total, an adequate set of requirements and guidance for establishing the Department's safety management program for protection of the health and safety of workers, the public, and the environment. Based in part on that testimony, the Board concluded that DOE needed to examine more closely the total set of requirements and guidance encompassing nuclear safety instead of embarking on piecemeal changes. As part of this proposed examination, the Board requested that DOE prepare a "mapping" or "cross-walk" showing the tracking of requirements from the existing set of 51 safety-related orders to the "new" orders and rules. DOE officials have stated that the cross-walk would be completed prior to the issuance of new orders and incorporation into contracts. Despite these assurances, DOE has not completed its own analysis to assure that important safety requirements have not been lost or inadvertently dropped.

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[5] These included DOE 4700.1, *Project Management*; DOE 6430.1A, *General Design Criteria*; and DOE 5820.2A, *Radioactive Waste Management*.

The Board has informed DOE that only six[6] of twelve[7] new or amended safety orders that DOE had issued by the end of 1995 provided safety management frameworks with safety levels comparable to those incorporated in their predecessors.

During 1995, DOE also embarked on a parallel process of replacing portions of the existing set of DOE safety orders with rules to be incorporated in Title 10 of the Code of Federal Regulations. Reviews by the Board and its staff in this arena raised issues identical to those encountered in the Order/Requirement Reduction Effort. Major deficiencies in several of DOE's proposed rules have been pointed out to DOE. The Board also has taken issue with DOE for failing to establish a single organization within DOE with technically competent individuals as the focal point responsible for the rule and order development effort. At present, there is no single organization within DOE responsible for carrying out this key assignment.

The Board recognized in 1994 that DOE's program to revamp its requirements system of rules, orders, standards, and guides was not being done as an integrated effort nor being directed at a common goal. Accordingly, the Board issued Recommendation 94-5 that stressed the need for the Department to establish clearly for its contractors and staff the relationship and expected manner of implementation of both the non-discretionary and discretionary components of its good practices governing defense nuclear facilities. The Secretary of Energy accepted this recommendation and submitted a plan for its implementation. Some progress has been made, but the issue has not yet been brought to closure. In part, this is because of the close connection of the 94-5 issues and those subsequently raised in the Board's Recommendation 95-2, dealing with standards-based safety management.

Notwithstanding the Department's good intentions, the results to date, in the Board's view, leave much to be desired. Of particular concern is the move toward generalization and minimization of discretionary guidance and non-discretionary requirements. In effect, this will give greater leeway to contractors to interpret how the requirements are to be met. In this regard, DOE is preparing many safety and implementation guides which identify acceptable methods for meeting specific requirements. Alternative methods for meeting the requirements may be proposed by the contractor. However, it is the Board's position that any implementation method selected must be justified to ensure that an acceptable level of safety, commensurate with the identified hazard, is achieved.

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[6] These six new orders covered *Emergency Management* (151.1), *Safety and Health Reporting Requirements* (231.1), *Startup and Restart of Nuclear Facilities* (425.1), *Life Cycle Asset Management* (430.1), *Departmental Materials Transportation and Packaging Management* (460.2), and *Accident Investigations* (225.1).

[7] Six other new orders had been provided to the Board as of the end of the year: *Performance Indicators and Analysis of Operational Information* (210.1); *Occurrence Reporting* (232.1); *Facility Safety* (420.1); *Worker Safety and Health Program* (440.1); *Packaging and Transportation Safety* (460.1); and *Directives System* (251.1).

Of particular concern to the Board about this restructuring is the effect it may have on the development of standards-based safety management programs. When safety requirements are more general and less specific, enormous demands are placed on the technical expertise of those charged with evaluating safety management programs based on these types of requirements. The Board has repeatedly urged the Department to increase the number of highly qualified staff assigned safety management functions (see Recommendation 93-3). It may be necessary for the Department to form special task teams using non-government employees with requisite expertise, such as has been done for Operational Readiness Reviews, to evaluate and approve safety management programs proposed by contractors for highly hazardous facilities and activities (see more detailed discussion of this issue in later sections of this report).

In attempting to resolve these problems, the Board issued Recommendation 94-5 which proposed that DOE take a systems engineering approach to establishing safety management programs and tailoring standards for such programs to the hazards of individual facilities and operations being conducted. Although the Secretary of Energy accepted Recommendation 94-5 on February 21, 1995, the implementation plan subsequently submitted to the Board was deficient in many respects, and the Board so informed the Secretary on September 15, 1995. Many of the key points in the recommendation that should have led to features in the plan were not included. An acceptable plan has not yet been issued. In the meantime, the Board has directed its staff to continue to work in parallel with DOE in overseeing the revision of individual safety orders, rules, and standards, and the Board has strengthened its call for integrated safety management programs by issuing Recommendation 95-2. The Board noted in its letter of November 2, 1995, that cooperation and progress had stalled on staff efforts to revise individual orders, rules, and guidance due to DOE's premature issuance of inadequate revised safety orders, policy statements, and guidance, and the Department's failure to provide the promised "cross-walk" which was to map the fate of all safety requirements contained in previous orders.

The Board has repeatedly urged DOE to review the adequacy of its safety requirements to create a solid base for the Department's safety management program. While strongly supportive of such efforts, the Board is, however, concerned that DOE, in its zeal to reduce and simplify requirements, has set aside or made optional well-established safety practices. The Board intends to continue its critical and constructive oversight of the "new" orders and proposed rules to ensure that the underpinning of safety management is not compromised.

DOE's Orders/Requirements Reduction Effort is continuing, as is the Board's continuing oversight of it. The dialogue between the Board and senior DOE officials remains candid and open regarding deficiencies identified by the Board and its staff, but a clear path forward to their resolution has yet to be developed.

In its Fifth Annual Report, dated February 1995, the Board considered the desirability of requesting legislative authority for the Board to establish safety standards to be used by DOE or alternatively to request legislative authority to approve standards developed by DOE. At that time, the Board concluded that such enhanced authority was unwarranted. The Board's experience in the past year is causing it to reassess that position (See later discussion on external regulation, beginning on page 29).

Board Guidance Concerning Standards-Based Safety Management

In keeping with Congressional intent as embodied in the Board's enabling statute, the Board has committed a considerable amount of its resources to oversight of how standards are used by DOE and its contractors in establishing and performing safety management of DOE's diverse defense nuclear activities. The focus of the Board's attention has been on the safety bases upon which DOE authorizes contractor performance of its more hazardous operations and the conditions it imposes on such operations in the interest of protecting public and worker safety and the environment. In this regard, the Board has observed considerable variability across sites and among facilities. Both the Board and the Department have been active in attempts to address this matter generically, as well as for specific facilities.

As one of its earliest formal interactions with DOE, the Board urged the Department, in Recommendation 90-2, to identify, assess the adequacy of, and determine compliance with the applicable safety standards at each of its defense nuclear facilities. The Board's continued attention to this matter is reflected in four additional formal Board Recommendations (91-1, 92-3, 93-1, and 94-5) that directly or indirectly involve applicable DOE safety standards. These recommendations and associated actions have been discussed extensively in previous annual reports. Neither the Board's efforts nor DOE's responses to date have brought standards-based safety management programs of the Department to the desired end state.

In a further effort to assist DOE to understand and apply safety standards, the Board issued a seminal technical report, *Fundamentals for Understanding Standards-Based Safety Management of Department of Energy Defense Nuclear Facilities* (DNFSB/TECH-5). The report describes a generic process that begins with hazards analysis and leads to definition of ways to: (1) prevent radiological exposure; (2) preserve and properly use safety features; (3) prepare for emergencies and mitigate effects of unanticipated events; and (4) manage the authorized activities safely. Such a process, when completed thoroughly and comprehensively, can result in the definition of an adequate safety management plan (tailored to the specifics of the facilities or activities) that the Board deems an essential part of the overall management plan for the contractor's conduct of specified work.

To further clarify and reemphasize the importance of establishing a standards-based set of safety requirements for operation of defense nuclear facilities, the Board also held a public meeting in late May, 1995 on Standards-Based Safety Management. During that meeting, the DNFSB/TECH-5 report was reviewed in detail to give DOE and the public an opportunity to fully understand the essential ingredients of safety management.

Concurrently with its development of a formal recommendation on this subject, the Board prepared a second report, *Safety Management and Conduct of Operations at the Department of Energy's Defense Nuclear Facilities* (DNFSB/TECH-6). This report elaborates on the concepts of safety management and conduct of operations as outlined in DNFSB/TECH-5 and addresses appropriate bases for authorizing operation of facilities or conduct of specific activities. Such a program delineates all those attitudes, processes, and precautions taken in the interest of safety, comparable in content and parallel to an Operating License issued by the Nuclear Regulatory Commission.

One of the initiatives undertaken by DOE in connection with its program for revising and promulgating standards has been an attempt to define a process for tailoring its generally applicable requirements to those needed for its diverse facilities and activities. The DOE objective is to impose upon any one operation or activity only those requirements that are "necessary and sufficient" to provide reasonable assurance of the safety of workers and the public, and the protection of the environment. In comparing this initiative with what the Board is advancing for defining adequate safety management programs, the Board observes some differences, but also much that is common.

In the interest of bringing the Board and DOE initiatives into synchronization, the Board issued[8] Recommendation 95-2 on October 11, 1995, recommending that DOE improve the focus of its entire standards effort and urging that the Department follow the guidance in DNFSB/TECH-5 and 6. On January 17, 1996, the Secretary accepted parts of the Board's recommendation and expressed the Department's willingness to continue the dialogue on sub-parts of the recommendation that DOE was not yet ready to accept.

In a pilot program initiated late in the year, the Board's staff used the guidance in DNFSB/TECH-5 and -6 for preliminary trial reviews of authorization bases for a representative sample[9] of 33 DOE facilities and activities identified as having the highest priority for Board attention[10]. The selection of facilities to be reviewed considered such factors as the severity of hazards, operational intensity, and expected lifetime of the operation involved. The sample included processing facilities, laboratory research and development facilities, and deactivation and decommissioning. Findings disclosed in the pilot program have been briefed to the Board, and will be provided to DOE as part of the Board's ongoing attention to this matter.

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[8] Copies of formal Board recommendations issued during 1995 appear in Appendix B.

[9] Facilities in the sample included Buildings 371 and 771 at the Rocky Flats Environmental Technology Site; TA-55 and CMR at LANL; the K-East Basin and the Tank Farms at the Hanford Site; and the DWPF and both canyons at the Savannah River Site. Specific activities included implementation of Recommendation 94-1 at the Rocky Flats Environmental Technology Site; assembly and disassembly operations at the Pantex Plant; and decommissioning work at the Hanford Site.

[10] The priority facilities and activities are presented in tabular form in Appendix A.

The scoping effort has been beneficial for two reasons. It demonstrates the soundness and adaptability of the TECH-5 and TECH-6 concepts for use in both identifying and evaluating the required elements of acceptable authorization bases, and demonstrates that the concepts in TECH-5 and -6 have general applicability, regardless of differences among processing facilities, weapons facilities, national laboratories, or activities. The review also identified significant deficiencies in the performance of hazards analysis and identification of preventive and mitigative systems, and in the establishment of approved authorization bases for operation of facilities or conduct of specific activities. In addition, the exercise provided a number of broad insights regarding the condition of existing facility authorization bases. In general:

- Gaps exist in the set of safety elements required for establishing authorization bases for several facilities. Exceptions were found in areas where the Board had previously called specific deficiencies to DOE's attention and where DOE had subsequently taken corrective action.

- In many cases, DOE's development of safety management plans does not address the entire spectrum of hazards that should be considered, analyzed, and mitigated. It appears likely that this occurs in many cases because existing DOE directives do not require in-depth analyses of scenarios involving accidents that are less severe than the design basis, or bounding accident.

- Authorization bases are consistently deficient in addressing worker safety. The Board emphasized this issue as a condition of readiness for long-term operation of any facility.

In contrast to these general inadequacies in authorization bases, there are several examples of successful efforts by DOE and its contractors, brought about in large measure by the Board's intervention and scrutiny of safety issues at the Savannah River and Hanford Sites. Application of the process described in DNFSB/TECH-5 and -6 to facilities at these sites has resulted in major improvements to safety management programs. Many identified vulnerabilities were subsequently eliminated, thereby providing reasonable assurance that the safety of the public, the workers, and the environment is adequately addressed, as demonstrated in the following examples:

> The original hazard/accident analyses for the Defense Waste Processing Facility at the Savannah River Site did not adequately assure confinement of potential hazards. As a result of the Board's attention, a more extensive, deterministic design basis analysis was conducted to evaluate potential effects on the public from postulated accident scenarios. An additional study was performed to evaluate the protection of co-located workers and workers assigned to the facility. These studies resulted in the establishment of additional systems to provide redundancy, the upgrading of certain systems to "safety-

related" status[11] to provide greater assurance of operation during and after an accident, and the establishment of additional administrative controls.

In early 1994, DOE planned to address the problems associated with deteriorating fuel in the K-Basins at the Hanford Site by encapsulating the fuel and sludge for continued underwater storage. Extensive Board attention has been applied to these basins, through Recommendation 94-1, staff assessments of facility operations, and, more recently, staff review of the authorization basis for the K-Basins. This involvement has helped focus attention on a more plausible path forward as well as a better defined authorization basis. Currently, the K-Basins staff has put in place most of the elements needed for an adequate authorization basis. An updated Safety Analysis Report and revised Operational Safety Requirements have recently been approved. A corresponding Safety Evaluation report has been prepared by DOE. In addition, a Standards/Requirements Identification Document has been approved by DOE and implemented into facility procedures. These activities provide not only a basis for authorization to operate the basins, but also a sound basis for review of new activities associated with removing the fuel from the basins.

The guidance in DNFSB/TECH-5 and -6 provides a descriptive, rather than prescriptive, methodology for an adequate certification-type process for either operation of a new defense nuclear facility or initiation of a significant new activity. In this regard, the process described in Recommendation 95-2 compares favorably with that currently being followed by the Nuclear Regulatory Commission in its consideration of safety of the gaseous diffusion plants.

The issuance of DNFSB/TECH -5 and -6 and the associated Recommendation 95-2 represents a proactive role in the Board's ongoing efforts to assist DOE in the development and implementation of adequate nuclear safety requirements and guidance. By setting forth its views on the essential elements of an adequate standards-based safety management plan that is fully compatible with industry practices throughout the domestic and international nuclear community, the Board has laid out a constructive path forward for DOE to revamp and modernize its safety management program.

Notwithstanding the Secretary of Energy's reserved acceptance of Recommendation 95-2, the Board is encouraged by growing evidence that some DOE Operations Offices and operating contractors have accepted, and are moving forward with, the development of safety management programs consistent with concepts advocated in the recommendation. Notable examples are the Savannah River Site, for the DWPF and the F-Canyon; the Hanford Site, for the K-East Basin Project; the Lawrence Livermore National Laboratory, for Building 332; the

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[11] Safety-related systems are subject to more stringent requirements regarding quality assurance, surveillance, and redundancy in order to improve reliability of the system function.

Los Alamos National Laboratory, for Building TA-55; and the Rocky Flats Environmental Technology Site, for Buildings 371, 707, and 771.

Continuing Efforts to Raise the Technical Competence and Expertise of DOE

The report of the Senate Armed Services Committee on S. 1085, that accompanied legislation establishing the Board includes the mandate: "The Board is expected to raise the technical expertise of the Department substantially . . . " The technical qualifications of DOE personnel who are assigned safety-related responsibilities have become increasingly important since the Board's establishment, not only because of the diminution of the extensive background and experience formerly residing in contractor organizations, but also because the less-prescriptive approach to safety management advocated by DOE will require greater reliance on judgments of highly experienced staffs. Examples of this increasing importance include:

- The Secretary of Energy's response to formal Board inquiries concerning the assignment of safety responsibilities [in DOE's *Manual of Functions, Assignments, and Responsibilities for Nuclear Safety* (FAR Manual); see next section] states that "competence commensurate with responsibilities" will be one of the five principles constituting the basis of DOE's Safety Management Program.

- In revising DOE rules and orders, representatives of the Office of Environment, Safety and Health (EH) have indicated that reviews of contractors' plans for implementing revised rules and orders will be feasible only if both Headquarters and Field Office employees' technical qualifications are improved.

- Under either the Safety/Requirements Identification Document (S/RID) closure process recommended by the Board in Recommendation 95-2, or the "necessary and sufficient" closure process advocated by DOE, the important safety determination of adequacy of facility authorization bases will hinge on review and approval by highly qualified DOE technical personnel.

In each of its previous annual reports, the Board has addressed DOE technical expertise, emphasizing repeatedly that the most important and far-reaching problem affecting the safety of DOE defense nuclear facilities is the lack of adequate numbers of qualified technical personnel in organizations responsible for safety at defense nuclear facilities. It remains the most critical problem today, despite significant efforts on the part of the Board.

From its inception, the Board has continually engaged DOE senior management in discussions addressing the importance that DOE must attach to obtaining and retaining technically qualified DOE personnel, both at headquarters and in the field. Numerous letters, as well as reports generated by the Board's technical staff, have been specifically directed to this subject; in the last three years alone, more than two dozen letters contained explicit observations of negative impacts on nuclear safety due in part to the limited technical competence of DOE personnel. Twelve of the 33 sets of formal recommendations the Board has made to DOE include specific comments on the need to strengthen the technical capabilities of DOE personnel.

In particular, in Recommendation 93-3, *Improving DOE Technical Capability in Defense Nuclear Facilities Programs*, the Board urged DOE to make a direct assault on this problem. The Board pointed out that, at that time, DOE had 200 excepted service positions authorized under the Department of Energy Act [42 U.S.C. § 7231(d)] which were not being used. As noted by the Board, excepted service personnel authority provides a proven means by which Federal agencies can attract highly qualified scientific and technical talent. Furthermore, the Board's testimony before Congress was instrumental in helping DOE obtain, in November 1994, excepted service personnel authority for 200 *additional positions*. In mid-1994, and throughout 1995, DOE was in the midst of filling approximately 1200 general schedule positions within the defense nuclear complex, providing a unique opportunity to dramatically raise the technical expertise in the Department.

Despite DOE's recruiting efforts during the 1994-95 period, the number of highly qualified technical personnel added to the Department remains minimal. The Board initiated a public airing of this issue at a public hearing held in Washington, D.C. on January 30, 1996, at which members of the Board's staff who studied this matter reported the following observations.

- Although DOE has added a significant number of new hires to its technical staff[12], most of these were not the senior, highly experienced individuals required for technical leadership roles. In fact, DOE hired no excepted service personnel in 1994; by the end of 1995, only 33 of the 400 (that is, less than ten percent) available excepted service positions had been filled.

- DOE elected to base its hiring efforts almost exclusively under the more constrained rules of the civil service system, rather than enrich the talent pool through outside recruitment under the excepted service provisions authorized by Congress. Analysis by the Board's staff of the collective technical capabilities of the 1994 and 1995 technical hires revealed that DOE general schedule hiring practices did not result in hiring a significant number of highly qualified technical personnel. Further, the technical applicant hiring process used by DOE tended toward selection of marginally qualified candidates. Selection of highly qualified candidates occurred with no greater frequency than that expected through a random process.

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[12] Personnel records show that DOE filled more than 900 technical billets in the defense nuclear complex during the 1994-95 period.

The Board notes that nearly half of the positions advertised by DOE were filled by individuals drawn from the existing DOE technical pool, a population considered by several prominent review groups (e.g. the National Research Council, the Advisory Committee on Nuclear Facility Safety, the Office of Technology Assessment, and the Galvin and Poston Task Forces) as lacking in scientific and technical excellence. At least half of these internal "hires" involved promotions. At the more senior levels (e.g., GS-14 and above), internal selection accounted for more than 80 percent of the positions filled.

Judging by these results, both the failure to use excepted service personnel authority and the marginal quality of the general schedule hirings, the Board concludes that DOE has not targeted recruitment of the exceptionally talented as Congress and the Board had advocated. As described in two cases below, if DOE desires to improve the technical capabilities of a particular unit, it can be done.

At the DOE Amarillo Area Office at the Pantex Plant and the DOE Y-12 Site Office at Oak Ridge, DOE managers have responded to Board prompting by augmenting their staffs, hiring 20 new, technically qualified personnel. The Y-12 Site Office, in particular, conducted a nationwide search for highly competent candidates. The effects of these newly hired individuals have been noted by the Board in such subject areas as improvements in the analysis, documentation, and control of the safety envelope; improved personnel training and qualification; and more formal control of nuclear weapons dismantlement processes. Each of these improvements can be directly attributed to the increases in the technical ability of the staffs. The Y-12 Plant and Pantex Plant experience shows the very positive results that can occur with DOE management's determination to make such improvements and willingness to use all of the tools at their disposal. The key to this effort was the Secretary of Energy's commitment to conduct a nationwide search for qualified candidates to fill the vacant safety related technical positions.

In contrast to efforts to bring new technical talent into the DOE system, a major portion of DOE's effort to "raise the technical expertise of the Department" has centered on the training and qualification of incumbent personnel under a program developed as an outgrowth of DOE's implementation plan for Recommendation 93-3. This program was to have been implemented by December 31, 1995. With respect to this Technical Qualification Program, the Board has observed that:

- reviews of assignments of personnel to functional areas at various Operations Offices and Headquarters reveal a lack of sufficient senior level management planning of the assignment process;
- although Department-wide standards for technical qualification in specific functional areas have been developed, reviews by the Board have identified

several as inadequate, others as marginal, and most as requiring specific improvements;

- approved training activities and acceptable equivalencies to meet competencies identified in technical qualification standards have not yet been identified, developed, or promulgated; and
- differences between the qualifications required for specific DOE technical positions and the competencies possessed by incumbents will be determined by the individual employees' supervisors; yet the technical expertise of many of the supervisors themselves is less than adequate.

The Board is aware of the difficult task it has asked DOE to accomplish in the face of substantial mandated reductions in total manning levels. As a result of such downsizing activities, however, the need to improve the Department's pool of unique technical expertise becomes all the more imperative. With the dictum of "Do more with less" in force, and with its heavy responsibilities for public health and safety, DOE must respond by obtaining and retaining the best technical talent.

However, the clear message from DOE's poor record in this area is that senior DOE officials have not placed enough emphasis on the solution to this problem. One important element in finding a solution to this vexing problem is for DOE to reinvigorate its middle to senior level managers with a greater sense of purpose and for DOE to pursue more aggressively methods for reassigning or removing poor performers. Given the importance of highly qualified DOE technical leadership to achieving safety objectives, the Board intends to continue its pressure on DOE to upgrade its technical capabilities.

The Board intends to resume its public airing of this issue by requesting DOE officials to explain the Department's 1994-95 recruitment efforts and its plans for accomplishing the upgrades committed in the implementation plan for Recommendation 93-3. The Board may also consider the advisability of seeking authority to establish or approve technical qualifications for selected safety positions within DOE.

Efforts to Improve the Definition of Safety Responsibilities Among Headquarters and Field Organizations

The Department continues to experience change in programs and organization. Throughout the past year, the Board has placed substantial emphasis on the need for the Department to establish a clear definition of roles and responsibilities for nuclear safety within the Department. This emphasis is an extension of a Board request in 1994 for the Department to define more clearly the nuclear safety responsibilities and organizational arrangements for all organizations with cognizance over defense nuclear facilities.

An important element of ongoing changes within DOE is the delegation of broad operational responsibilities to field organizations. This emphasis, along with proposed elimination from DOE orders of the assignment of responsibilities to Federal employees, places increased importance on the content of DOE's *Manual of Functions, Assignments, and Responsibilities for Nuclear Safety* (FAR Manual).

In response to the Board's 1994 request, the Secretary issued Revision 1 to the FAR Manual. The manual, already in its second revision, consisted entirely of extracts of DOE order requirements assigned to Federal employees, most notably Cognizant Secretarial Officers and Heads of Field Elements. Although the FAR Manual was a step in the right direction, its emphasis on assignment of responsibilities at only the highest levels did not support achievable and prompt implementation and thus it quickly became out-of-date.

The Board has continued to: (1) emphasize the importance it attaches to keeping the FAR Manual updated, and (2) ensure that DOE line management clearly understands its responsibilities. DOE does not appear to share the same sense of importance.

DOE has committed to updating the FAR Manual early in 1996, but, in the Board's view, without sufficient capable effort and active direction by top management, that schedule appears to be overly optimistic. Representatives of the Department have also stated their intent to reflect, in revisions of the FAR Manual, the results of the response and implementation plan for Recommendation 95-2, regarding Safety Management Programs for DOE defense nuclear facilities. While the Board agrees that the FAR Manual will eventually need to reflect the results of 95-2 implementation, an update of the FAR Manual should not be delayed awaiting the completion of the 95-2 Implementation Plan.

Safety Management of Laboratory Research and Development (R&D)

In late 1994, and throughout 1995, the Board held a series of discussions with DOE and representatives of the three nuclear weapons laboratories, focused on the integrated management of safety at DOE's weapons research and development facilities. Associated activities included: eight trips by the Board and its staff to the national laboratory sites; issuance of a formal reporting requirement to DOE; a meeting in Albuquerque with senior DOE and laboratory representatives; two public meetings; two status meetings in the Board's Washington offices; and other activities by the Board and its staff.

Nuclear R&D requires an environment that encourages creativity and fosters a management approach that is flexible enough to permit the safe execution and control of a wide variety of activities. The weapons laboratories had expressed concern that DOE's current safety management approach did not permit the required flexibility and was not improving R&D operational safety. During 1995, the Board engaged DOE and the laboratories in frank discussions on the perceived problems and potential solutions.

In late April, pursuant to its authority under 42 U.S.C. § 2286b(d), the Board requested that DOE provide a report that addressed:

- whether there is adequate DOE guidance on the subject of integrated safety management of R&D activities;
- how DOE plans to ensure the availability of adequate technical talent, mechanisms, acceptance criteria, and an exception approval process to address laboratory-proposed integrated safety management systems; and
- what DOE needs to do to coordinate line management and independent oversight safety audits at the weapons laboratories.

On May 25, the Board met with senior DOE management and the heads of the three weapons laboratories to discuss the basis for the Board's reporting requirement. During that meeting, the manager of the Albuquerque Operations Office assumed the responsibility for coordinating DOE's response. DOE representatives at this meeting stated that the Board's reporting requirement provided an opportunity that is broader than the obligation to address the specific issues that the letter contained. Later correspondence between the Albuquerque Operations Office Manager and DOE Headquarters reemphasize this, by stating:

> "The development of this report is extremely important to continuing the missions of the laboratories while efficiently ensuring the safety of the workers, public and the environment. I believe this report provides DOE and the laboratories with the unique opportunity to create model Management Systems that integrate Environment, Safety, and Health (ES&H) at each laboratory. These laboratory management models will meet laboratory management requirements while meeting DOE responsibilities and DNFSB expectations."

An interim response to the Board's reporting requirement was formally submitted on September 15, including DOE's commitment to work cooperatively with the laboratories, and with the Board, to develop and implement integrated safety management systems at the weapons laboratories. DOE and the weapons laboratories have stated their commitment to additional effort in 1996, and potentially into 1997, on the development of the principles, implementation strategies, and actual implementation of integrated safety management of R&D activities. The Board will continue to exercise oversight of this important effort.

Readiness of Facilities to Operate

Since the Board's inception, the Board and its staff have closely scrutinized the preparations for starting or restarting activities at defense nuclear facilities and the conduct of associated readiness reviews. Confirmation of readiness to proceed is a major element of an acceptable safety management program as outlined in Recommendation 95-2. The Board made a number of recommendations that addressed standards for performance of operational readiness reviews, including Recommendations 90-4, 91-3, 91-4, 92-3, 92-5, and 92-6.

In Recommendation 92-6, the Board urged DOE to develop uniform orders and guidance to govern the readiness review process for startup or restart of activities. In response, DOE developed a new order, DOE 5480.31, *Startup and Restart of Nuclear Facilities* and a new DOE standard, DOE-STD-3006-93, *Planning and Conduct of Operational Readiness Reviews*, both of which apply to all operations at defense nuclear facilities except nuclear explosive operations. In 1995, the DOE Nevada and Albuquerque Operations Offices completed development of separate interim guidance to govern readiness reviews for nuclear testing and weapons assembly and disassembly operations. This interim guidance is intended for use until implementation of Recommendation 93-1 is completed.

Both the order (now designated as DOE 425.1) and the standard were revised in 1995, to respond to Board comments and to provide clarification in some areas, based on readiness review experience across the complex. With these developmental efforts completed, DOE's commitments under Recommendation 92-6 were met and the recommendation was closed by the Board in October 1995.

The Board and its staff continue to monitor readiness preparations for startup/restart and conduct of readiness reviews throughout the complex. In general, the Board has observed continued improvement in line management preparations for startup or restart of operations and the conduct of readiness reviews. In the past year, the Board closely followed the readiness preparations and conduct of readiness reviews involving:

- the Defense Waste Processing Facility and the In-Tank Precipitation Facility at the Savannah River Site;
- the F-Canyon and FB-Line facilities at the Savannah River Site;
- weapons disassembly activities at the Pantex Plant;
- stabilization of plutonium solutions in Building 771 at the Rocky Flats Environmental Technology Site;
- plutonium operations in Building 332 at Lawrence Livermore National Laboratory;
- receipt, shipment and storage of highly enriched uranium at the Oak Ridge Y-12 Plant, including reviews leading up to Project Sapphire;
- the special unload project for tritium reservoirs at Mound Laboratory; and

- the uranyl nitrate hexahydrate stabilization project at the Fernald Environmental Management Project.

These activities are discussed in more detail in other sections of this report. The Board will continue to monitor line management preparations for the startup or restart of an activity and the conduct of readiness reviews in accordance with the requirements of DOE Order 425.1.

Department-wide Radiological Protection Program

Early in its history, the Board conducted extensive reviews and assessments of radiological protection programs at a number of facilities. This review effort disclosed a number of significant weaknesses in the Department's radiological protection program. As a result of the identified weaknesses, the Board issued Recommendation 91-6 in December 1991, emphasizing a need for increased DOE attention in five major areas: (1) DOE management and leadership in radiological protection programs; (2) radiological protection standards and practices at defense nuclear facilities; (3) training and competence of health physics technicians and supervisors; (4) analysis of reported occurrences and correction of radiological protection program deficiencies; and (5) understanding and attention to radiological protection issues by individuals and contractor organizations.

During the ensuing five years, a major Board effort has been devoted to tracking and evaluating DOE's implementation of Recommendation 91-6. In response to Recommendation 91-6, DOE has moved to strengthen various aspects of their radiological protection programs, including:

- issuance of 10CFR835, Occupational Radiation Protection;
- upgrading of occupational radiation training and certification of workers;
- development and promulgation of a Radiological Control Manual, a guide to good radiation practices; and
- authorizing the Department's M&O contractors to add additional staff to their radiological protection programs.

Although DOE has made progress in addressing some of the improvements needed, many commitments have been unnecessarily delayed. As a result, in late July 1995, the Board wrote to DOE criticizing the delays and observing that they were traceable to DOE's failure to designate specific DOE personnel responsible for commitments made in the 91-6 DOE Implementation Plan. Since then, DOE has initiated efforts to update the implementation of Recommendation 91-6 to reflect current realities, changed DOE approaches, and continuing Board interest.

During 1995, the Board conducted assessments of radiological protection programs at the Savannah River Site, the Hanford Site, the Rocky Flats Environmental Technology Site, the Mound Laboratory, and the Oak Ridge Y-12 Plant. Those assessments disclosed that worker exposures generally have been kept within established bounds. However, judged in terms of the need for radiological engineering and work planning to keep routine exposures low and the chance of accidental exposures small, implementation of good practices requires some improvement, especially at the Hanford Site. In particular, the need at Hanford to acquire sufficient numbers of competent personnel with the requisite technical expertise has been identified as essential to establishing and maintaining a radiation protection program in which radiation exposures are as low as reasonably achievable. The Board has concluded that this will be especially important as deactivating and decommissioning facilities require greater fractions of the total work effort and the associated hazards of moving, handling, and processing radioactive material increase.

In general, the radiological control program throughout the DOE complex has been improving. However, the quality of the program is inconsistent from site-to-site and from facility-to-facility on a site. In 1992, DOE issued its Radiological Control Manual and guidance documents to provide the framework of a radiological protection program that contractors could use in achieving radiation protection objectives. During 1995, the Board and its staff were deeply involved in reviewing the new DOE approach to standards in the radiological protection areas, including the newly published 10 CFR 835, *Occupational Radiation.*

B. ASPECTS OF INTERNAL BOARD OPERATIONS

Current Board Authority as a Means to Influence DOE Actions

Formal Recommendations

The Board's enabling statute is, in the words of the D.C. Circuit Court of Appeals, "action forcing." For example, the power in the Board's authority to issue recommendations is substantial. It rests on two foundations. The first is the Board's ability to articulate technically sound and persuasive support for actions it advocates, in a way that convinces the Department of the merits of those recommended actions. Secondly, the requirement for the Secretary to justify rejection of a recommendation in formal reports to cognizant Congressional Committees has been acknowledged by DOE to be a very powerful forcing action.

In Part 2 of its Fifth Annual Report, the Board provided a comprehensive analysis of the recommendation process. Since that analysis was completed, the Board has issued two additional sets of recommendations, including eight individual specific recommendations. Thus, in total, 33 formal Board recommendations, consisting of 147 individual recommendations, have been made to the Secretary of Energy concerning actions necessary to protect public health and safety. The first 32 recommendations have been accepted by the Secretary.

The Board's most recent Recommendation, 95-2, *"Safety Management,"* was submitted to DOE on October 11, 1995. On January 17, 1996, the Secretary accepted parts of the Board's recommendation and expressed the Department's willingness to continue the dialogue on sub-parts of the recommendation that DOE was not yet ready to accept. The Board is currently exploring with DOE those provisions of this recommendation that the Secretary did not fully accept, for further resolution.

Also during the ensuing period, an additional six sets of recommendations have been fully closed or subsumed by later recommendations. The remaining 17 are in various stages of implementation. Updated versions of the tabular data concerning elapsed times presented in the Fifth Annual Report appear here as Tables 1 and 2.

The Board has reexamined its last year's analysis and found it to be confirmed by its experience in the past year. When a Board recommendation is precise in its language, with clearly stated, achievable deliverables and associated milestones for their completion and is compatible with DOE's missions and schedules, DOE is more likely to understand and respond favorably. When the problem addressed by a Board recommendation is generic, involving the entire defense nuclear complex or a combination of facilities and sites, or when the subject appears to be at odds with DOE's current priorities and schedules, the reaction is more likely to be resistant and to lead to considerable delay in its implementation..

3/25/96

Elapsed Times to Key Events Associated with Board Recommendations

Rec No	Subject	Issue Date	SOE Accept Date	IP Rev 0 Date	Bd Accept IP Date	Closure Date	SOE Increm to Accept	Increm to Dev Plan	Increm to Revise	Increm to Close	Elapsed Time to Closure	Total Elapsed Time to Date
90-1	Reactor Operator Training/Qualifications.	2/22/90	4/10/90	7/13/90	2/7/91	10/27/92	47	94	209	628	978	
90-2	Identify stds; assess adequacy, determine implementation.	3/8/90	6/12/90	9/17/90	11/1/95	11/1/95	96	97	1871	0	2064	
90-3	Monitoring and Corrective Actions for selected tanks.	3/27/90	5/16/90	8/13/90	10/12/90	5/1/92	50	89	60	567	766	
90-4	Conduct and content of ORR's for Rocky Flats buildings.	5/4/90	6/20/90	11/30/90	2/15/91	2/16/95	47	163	77	1462	1749	
90-5	Systematic Evaluation Program for Rocky Flats activities.	5/18/90	6/13/90	10/19/90	5/4/94	11/1/95	26	128	1293	546	1993	
90-6	Develop program for removal of Plutonium in ducts.	6/5/90	7/24/90	11/30/90	8/17/92	11/1/95	49	129	626	1171	1975	
90-7	Expansion of Recommendation 90-3 to cover ferrocyanide tanks.	10/12/90	12/3/90	3/7/91	5/6/94		52	94	1156			1991
91-1	Improvement needed in DOE standards development program.	3/7/91	5/13/91	8/16/91	10/27/92	10/27/92	67	95	438	0	600	
91-2	ROMP closure packages and practices.	3/27/91	5/14/91	8/7/91	10/27/92	10/27/92	48	85	447	0	580	
91-3	WIPP Readiness Review.	4/25/91	6/5/91	8/7/91	10/27/92	10/27/92	41	63	447	0	551	
91-4	Expansion/clarification of R 90-4 on Bldg 559 ORR	9/30/91	11/6/91	11/8/91	2/3/92	5/1/92	37	2	87	88	214	
91-5	Savannah River K Reactor Power Limits.	12/19/91	2/7/92	2/7/92	8/27/92	4/7/93	50	0	202	223	475	
91-6	Need for improved department-wide guidance on rad protection.	12/19/91	1/31/92	6/17/92	7/2/93		43	138	380			1558
92-1	Need for ORR on HB Line.	5/22/92	10/20/92	10/20/92	10/27/92	10/27/92	151	0	7	0	158	
92-2	Need for improvement in DOE Facility Representative Program.	5/28/92	7/20/92	11/5/92			53	108				1397
92-3	Expansion on R 92-1; inadequacy of previous ORR's on HB Line.	5/29/92	9/15/92	9/21/92	10/16/92	2/3/93	109	6	25	110	250	
92-4	Improve Project Management and Design Control at Hanford MWTF.	7/6/92	8/28/92	2/5/93			53	161				1358
92-5	Discipline of Operation during period of changes in mission.	8/17/92	12/16/92	12/21/92	1/8/93	1/8/93	121	5	18	0	144	1316
92-6	Need for DOE guidance on content, timing and staffing for ORR's.	8/26/92	10/19/92	1/19/93	4/29/94	11/1/95	54	92	465	551	1162	1307
92-7	Need for broad improvement in DOE Training/Qualification Programs	9/22/92	1/19/93	11/4/93	11/4/93	11/4/93	119	289	0	0	408	
93-1	Need for consistency between Orders for weapons/production facils	1/21/93	4/27/93	7/19/93	7/30/93		96	83	11			1159
93-2	Need for continued general purpose Department criticality program	3/23/93	5/12/93	8/10/93	9/30/93		50	90	51			1098
93-3	Implement step change in DOE technical staff qualifications	6/1/93	6/23/93	11/4/93	11/5/93		22	134	1			1028
93-4	Need for improved tech mgt and oversight of ERMC's.	6/16/93	8/6/93	11/8/93	11/18/93		51	94	10			1013
93-5	Accelerate waste characterization program	7/19/93	8/31/93	1/25/94	3/25/94		43	147	59			980
93-6	Need to retain access to capability/knowledge of weapons experts	12/10/93	2/2/94	7/5/94	8/2/94		54	153	28			836
94-1	Expedite remediation of SNM storage/stabilization/disposition	5/26/94	8/31/94	12/5/94	5/5/95		97	96	151			669
94-2	Comprehensive review of low-level waste program	9/14/94	10/28/94	4/10/95	6/15/95		44	164	66			558
94-3	Apply Sys Eng to dev prog for protection against nat.phenomena	9/26/94	11/18/94	6/30/95	10/3/95		53	224	95			546
94-4	Raise Conduct of Ops to acceptable level	9/27/94	11/18/94	2/24/95	3/28/95		52	98	32			545
94-5	Integrate DOE Safety Orders, Rules and other Requirements	12/29/94	2/21/95	7/19/95			54	148				452
95-1	Need to improve safety of depleted UF6 cylinders	5/5/95	6/29/95	10/16/95	11/1/95		55	109	16			325
95-2	Need to improve focus of standards effort	10/11/95										166

Table 1

03/25/96

Elapsed Time to Key Events for Complex-Wide Board Recommendations

Rec No	Subject	Issue Date	SOE Accept Date	IP Rev 0 Date	Date BD Accepts IP	Closure Date	SOE Increm to Accept	Increm to Dev Plan	Increm to Revise	Increm to Close	Elapsed Time to Closure	Elapsed Time to Date
90-2	Identify stds; assess adequacy; determine implementation.	3/8/90	6/12/90	9/17/90	11/1/95	11/1/95	96	97	1871	0	2064	
91-1	Improvement needed in DOE standards development program.	3/7/91	5/13/91	8/16/91	10/27/92	10/27/92	67	95	438	0	600	
91-6	Need for improved department-wide guidance on rad protection.	12/19/91	1/31/92	6/17/92	7/2/93		43	138	380			1558
92-2	Need for improvement in DOE Facility Representative Program.	5/28/92	7/20/92	11/5/92			53	108				1397
92-5	Discipline of Operation during period of changes in mission.	8/17/92	12/16/92	12/21/92	1/8/93	1/8/93	121	5	18	0	144	
92-6	Need for DOE guidance on content, timing and staffing for ORR's.	8/26/92	10/19/92	1/19/93	4/29/94	11/1/95	54	92	465	551	1162	
92-7	Need for broad improvement in DOE Training/Qualification Programs	9/22/92	1/19/93	11/4/93	11/4/93	11/4/93	119	289	0	0	408	
93-1	Need for consistency between Orders for weapons/production facils	1/21/93	4/27/93	7/19/93	7/30/93		96	83	11			1159
93-2	Need for continued general purpose Department criticality program	3/23/93	5/12/93	8/10/93	9/30/93		50	90	51			1098
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93-4	Need for improved tech mgt and oversight of ERMC's.	6/16/93	8/6/93	11/8/93	11/18/93		51	94	10			1013
94-2	Comprehensive review of low-level waste program	9/14/94	10/28/94	4/10/95	6/15/95		44	164	66			558
94-5	Integrate DOE Safety Orders, Rules and other Requirements	12/29/94	2/21/95	7/19/95			54	148				452
95-2	Need to improve focus of standards effort	10/11/95										166

Table 2

After DOE acceptance and implementation of Board recommendations, safety improvements have been made in such fundamental areas as operational readiness reviews; compliance with safety standards, orders and requirements at certain facilities; technical training at DOE sites; discipline of operations; the safe handling of nuclear materials; and radiation protection. However, the pace of progress has been slow, especially in increasing the number of qualified technical DOE personnel and in development of a sound, standards-based, complex-wide safety management program.

The Secretary of Energy has testified that the Board's actions, primarily in its formal recommendations, had assisted the Department in identifying and correcting public health and safety deficiencies at defense nuclear facilities. Key areas for which the Secretary was most appreciative of the Board's oversight included compliance with DOE safety requirements including orders; hiring, retention, education, and training of DOE's technically-qualified personnel; readying facilities to operate safely, and conduct of operations.

Both the Board and DOE have learned much about smoothing the recommendation process during the past six years. Establishment of joint working groups early in the process contributes to satisfactory resolution of disagreements, and DOE's designation of a responsible senior manager to lead its development and completion of an acceptable implementation plan has greatly improved the earlier record. Not all the previous disagreements have been resolved, but some progress has been made, and the Board is confident that it can be sustained. The cooperation evident in the development of meaningful implementation plans for the most recent Board recommendations is a good omen, and with each such achievement, the climate improves further. Though some problems in actually completing implementation plans remain, these are, for the most part, amenable to correction by sustained attention of senior managers in both organizations. The Board reiterates its earlier conclusions regarding the effectiveness of the recommendation process, and refers the reader to Part 2 of its Fifth Annual Report for a thorough review of the subject.

Reporting Requirements

The Board's authority to establish binding reporting requirements, 42 U.S.C. § 2286b(d), is likewise a strong forcing function which has been effective in causing DOE to take actions to generate the information the Board seeks. This is particularly effective when the Board determines it to be likely that activities needed to generate a mandated report will provide irrefutable evidence of a problem, and will likely do so in a manner that points the way to DOE's resolution of the issue of interest to the Board. Several examples of the Board's exercise of this authority are presented in other sections of this report, as well as in earlier annual reports.

Public Hearings and Public Meetings

Finally, the statute also authorizes the Board to hold hearings on safety matters of concern, under 42 U.S.C. § 2286b(a). The Board has learned that conducting public hearings, or less formal public meetings in which the public may observe the Board as it reviews particular subjects with its own staff or with DOE representatives, is a particularly useful tool for helping to determine the causes for DOE delays in implementing Board recommendations aimed at achieving safety improvements. During the past year, the Board has used these tools more frequently, and has found them valuable, not only to improve public access to the Board's activities but also to obtain meaningful commitments from DOE officials.

In this connection, the Board has found that questioning key DOE and contractor witnesses in a public forum focuses the witnesses on the need for obtaining technically supportable and reliable answers. The Board's authority to obtain information in a hearing and under oath, if necessary, is quite compelling. For example, it is possible that holding such hearings could have pinned down more effectively and expeditiously the nature of technical and administrative problems, identified areas of disagreement between the Board and DOE and contractor personnel, and ultimately prompted DOE to complete some safety improvements more quickly in implementing such fundamental Board recommendations as 90-2 (development and implementation of safety requirements), 91-6 (radiation protection), 93-3 (improving DOE technical competence), and 93-5 (waste characterization).

Questioning in public forums creates an atmosphere of accountability--an atmosphere that conveys the Board's intent to use every available vehicle to achieve safety progress. It also provides leverage through public and peer pressure to meet commitments contained in implementation plans for Board recommendations accepted by DOE, and serves notice that unjustifiable delays will not be tolerated by the Board. The Board has used such hearings to good effect regarding, for example, the need to take prompt and vigorous steps to stabilize fissionable material in process lines and vessels, spent nuclear fuel, and waste materials; characterization of waste stored in the Hanford Tank Farms; and needed improvements in DOE's program for development, promulgation, and implementation of safety standards.

Response to public meetings and hearings such as these has been very positive. For example, representatives of labor organizations, the Texas State Senate, the City of Amarillo, local businesses, citizens' groups, and many individuals from the vicinity of the Pantex Plant responded to a public hearing by writing letters to the Board to applaud its openness, to express their views that the Board and its staff have performed admirably, and to endorse the Board's continuing oversight role. Similar responses have been received from neighbors of the Rocky Flats Environmental Technology Site and the Savannah River Site.

Participation in the Work of the Advisory Committee on External Regulation of Department of Energy Nuclear Safety

On January 25, 1995, with the support of the White House Council on Environmental Quality (CEQ), the Secretary of Energy created an Advisory Committee on External Regulation of the Department of Energy's nuclear activities. Some, but not all of these activities are regulated under provisions of laws pertaining to environmental protection. In 1988, Congress provided for oversight of the nuclear safety aspects of DOE's defense nuclear facilities by establishing the Board.

The Secretary's action in setting up the Advisory Committee was stimulated in part by a Congressional Subcommittee's interest in the idea of external regulation rather than oversight and a Department perception that the public acceptability and credibility of the Department's future activities could be enhanced through external regulation of nuclear activities. The Board was requested by CEQ and the Secretary of Energy to participate in the Advisory Committee's study. In the spirit of cooperation, the Board contributed to this matter through the active participation of Board Member Joseph J. DiNunno. This proved to be no small chore on his part.

The Committee's report, *"Improving Regulation of Safety at DOE Nuclear Facilities,"* dated December 1995, which advocates external regulation, was released to the public on January 19, 1996. Both the Board and the Nuclear Regulatory Commission were identified as candidate agencies around which such a regulatory program might be structured. Although the report purports to represent views of the Committee as a whole, there was in reality strong consensus on only a few of the conclusions and considerable diversity of views on others. Mr. DiNunno issued a statement of separate views which is appended to the Committee's final report. In his statement, Mr. DiNunno supported a number of the concepts and ideas in the Committee's report and explained in brief his objections to a number of specific recommendations.

The Board's initial reaction is that any regulatory model that embodies all the concepts recommended in the Committee's report will exacerbate the Department's problems, not solve them. Modest expansion of the Board's statutory authority would go a long way toward achieving many of the perceived benefits of external regulation, and at much lower cost. Such an expanded role for the Board might include, for example, greater powers involving: (1) standards setting; (2) approval by the Board of authorization bases for operating high hazard facilities; and (3) approval of qualification requirements for selected safety positions. This concept of an incremental increase in the Board's functions was presented to the Committee during its deliberations. It was never considered seriously.

The matter of external regulation of defense nuclear facilities is particularly sensitive since national security issues are involved. The Board is sensitive to not only this aspect of increased regulatory oversight of DOE defense nuclear activities, but also the cost implications of legalistic, formal regulatory procedures. NRC estimated an additional cost of $100 to $300 million per year and an additional 1100 to 2000 full-time employees if it were to assume regulatory responsibility similar to the certification process used for the gaseous diffusion plants; licensing of new DOE facilities was not included in NRC's estimate. In addition, if the Committee's recommendation were to be implemented in full, it would provide greater opportunity for citizen lawsuits in defense nuclear activities than currently exists in the commercial nuclear regulatory arena.

New/Rotated Site Representatives

During 1995, the Board continued to increase its on-site oversight of defense nuclear facilities by assigning two experienced staff members to full-time duty at the Rocky Flats Environmental Technology Site (RFETS). Technical staff members already had been stationed at two other DOE sites; two individuals who are assigned to the Pantex Plant, and one who is assigned to the Hanford Site. During the past year, the Board also completed the first rotation of staff members assigned as site representatives at the Pantex Plant, thus highlighting an additional potential career path for the Board's technical staff. A second site representative was assigned to the Hanford Site in March 1996 and the Board expects to have a full-time staff member at the Savannah River Site by mid-year.

The Site Representatives Program has greatly expanded the Board's ability to closely monitor DOE activities. Site representatives have facilitated prompt identification of health and safety concerns and in conducting daily assessments of nuclear safety management at the priority sites to which they have been assigned. Site representatives regularly interact with the public, union members, Congressional staff members, and public officials from federal, state, and local agencies. The Board has received numerous unsolicited comments from members of these groups reflecting favorably on the performance of the assigned site representatives.

C. SAFETY ASPECTS OF DESIGN AND CONSTRUCTION OF DEFENSE NUCLEAR FACILITIES

Defense Waste Processing Facility at the Savannah River Site

The Defense Waste Processing Facility (DWPF) is a large, new vitrification plant designed to convert highly radioactive waste into a stable borosilicate glass form. Construction began in 1983, before the facility was completely designed. Detailed design proceeded concurrently with construction through the late 1980's. Since then, additional facility design improvements determined to be either desirable or necessary have been identified and implemented. The chemical processes involved are extremely complex. They are significantly complicated by the presence of high-level waste (HLW) and the resulting need for remote handling of the material.

During the past several years, the Board and its staff have emphasized to DOE the importance of providing defense-in-depth in both the design and the operation of the plant. This emphasis has led to improvements in designs and operational modes, including: upgrading of selected critical plant systems to safety class; installing backup nitrogen inerting systems on process vessels; improving training and qualification programs; and reducing the potential number of simultaneous safety-critical alarms in the control room.

At year-end, DWPF preoperational testing was nearing completion, and DOE had scheduled a comprehensive Operational Readiness Review (ORR) in anticipation of an early 1996 startup. The Board's staff will observe the readiness review and assess the results.

In-Tank Precipitation Facility at the Savannah River Site

At the In-Tank Precipitation (ITP) facility, sodium tetraphenylborate (TPB) is used to concentrate and remove radioactive cesium from the waste stream in preparation for processing at the Defense Waste Processing Facility. During the process, chemical and radiolytic decomposition of the TPB occurs, liberating substantial quantities of highly flammable benzene. This situation creates the potential for a tank deflagration accident that could release large amounts of radioactive material. Safeguarding against this potential situation has been a major focal point of Board scrutiny.

Another focus of the Board's attention at this facility was an assumption in the ITP safety analysis that benzene vapor in the tank head space would be well mixed. Benzene vapor is significantly denser than air or nitrogen and thus there is a distinct possibility that flammable pockets of benzene vapor could develop near the liquid surface of the waste. Based on an analytical study of this issue by its staff, the Board has prodded DOE to perform a detailed fluid dynamics analysis to determine whether this assumption of a well-mixed vapor in the tank head space is indeed valid. The Board also established the need for an on-line sampling system to measure temperature and vapor concentrations throughout the tank. This system has proven valuable in helping to analyze recent unexpected conditions.

Although several tests and experiments have been performed during the last 13 years, the exact processes which result in the production and liberation of benzene are not well understood. Unexpectedly, the release of benzene is significantly increased by forced mixing resulting from operation of the slurry pumps. The resultant concentration of benzene in the vapor space would likely exceed Operational Safety Requirement (OSR) limits during multiple slurry pump operation. This anomalous behavior is being examined assiduously by both the Board and DOE as part of pre-operational preparations.

An Operational Readiness Review performed by the Westinghouse Savannah River Company (WSRC) in October 1994 determined that training and qualification of operating and support personnel were still at a very early stage. Furthermore, high quality procedures needed by operators were not sufficiently in place. The Board insisted that the ORR be redone when

ITP was better prepared to start up and operate. A supplemental ORR, performed by WSRC in the April-May 1995 period, was much more effective at confirming facility readiness. The subsequent ORR performed by DOE supported this by identifying only a limited number of additional deficiencies requiring correction.

The Board will continue to review upcoming ITP activities, including Unreviewed Safety Question Determinations associated with postulated benzene production and release mechanisms, testing evolutions, plant modifications, and research.

Structural Adequacy of Plutonium Storage Facility at the Rocky Flats Environmental Technology Site

In 1993, DOE formulated plans to consolidate storage of large amounts of plutonium in Building 371 at the Rocky Flats Environmental Technology Site (RFETS). The building was not originally designed for this mission. The Board reviewed the design of the building, including the building's capacity to withstand external forces from natural phenomena (e.g., earthquakes). Based on its review, the Board concluded that activities to prepare Building 371 for an extended storage role were neither logically structured nor sufficiently broad in scope to establish structural adequacy under loadings from unusual natural phenomena.

In September 1994, the Board issued Recommendation 94-3, *Seismic and Safety Systems,* addressing this matter. During DOE's preparation of an implementation plan, the Board spurred DOE to take a systems engineering approach in the development of an integrated plan that addresses the civil-structural-seismic and systems safety issues and evaluations involved. In October 1995, DOE completed an analysis which determined that the building could be made structurally adequate provided several structural upgrades were accomplished. DOE is currently planning to make these upgrades. Based on further efforts to systematically assess the plans for Building 371, DOE is now evaluating whether there are better options for storing special nuclear material at the Rocky Flats Environmental Technology Site.

Los Alamos National Laboratory (LANL) Design Process for the Chemistry and Metallurgy Research (CMR) Building

In late 1994, the Board, its staff, and its outside experts reviewed preparations for a testing program designed to study reactions of molten plutonium with other materials within full-sized components from dismantled nuclear weapons. For this program, LANL had already begun upgrading the structural capability of a portion of its Chemistry and Metallurgy Research Building and had been constructing an experimental apparatus.

The Board's reviews disclosed that even though the contract for the building upgrade had been placed and an experimental apparatus was being fabricated, potential hazards did not appear to have been fully identified, and no clear analytical process for identifying them was apparent.

Based on these disclosures, the Board requested that DOE provide a report identifying the formal processes LANL follows in design, construction and preparation for operation of new and upgraded facilities. As a result, LANL has begun to clarify and implement an improved system for technical management of such projects.

Preparations for Major Upgrades at LANL CMR Building

LANL is planning upgrades of the CMR Building totaling more than $100 million, including major changes in the electrical systems. Based on a review by the Board's staff, it appears that a proper identification of hazards for the probable mission of CMR would lead to the necessity of providing emergency/standby power. LANL stated that while emergency/standby power will be considered for the upgrades, it is possible that neither emergency nor standby power would be implemented. This matter was brought to the attention of DOE line management.

Configuration Management was also reviewed at CMR. The fundamental objective of configuration management is to establish and maintain consistency among the facility design basis, physical configuration, and facility documentation for safety-related structures, systems and components. It appears that configuration management activities need to be considerably strengthened prior to significant additional work on the CMR upgrades.

Guidance for Conducting Readiness Reviews at the Nevada Test Site (NTS)

In June 1995, the Board received revised interim DOE guidance for the conduct of readiness reviews for testing of nuclear devices, termed "Testing Readiness Assessments." This guidance was originally developed in response to Recommendation 92-6, *Operational Readiness Reviews*, and was subsequently revised to address Board comments regarding when such assessments are required. The Board accepted the Testing Readiness Assessment guidance as meeting the intent of Recommendation 92-6 for the conduct of readiness reviews of tests of nuclear devices at the Nevada Test Site (NTS), should such operations be resumed in the future. DOE has committed to use the process until additional guidance, to be developed as part of Recommendation 93-1 implementation, becomes available.

Device Assembly Facility (DAF) at the Nevada Test Site (NTS)

The Device Assembly Facility (DAF) at NTS is a new, moderate hazard facility for nuclear explosive operations, that was originally intended for assembling one-of-a-kind nuclear test devices. However, a broader range of operations, such as disassembly, modification, staging, maintenance, repair, retrofit, and surveillance of nuclear weapons, could be accommodated within the DAF mission with only modest changes. The Board and its staff reviewed the DAF safety basis and the design of selected systems, in anticipation of its upcoming ORR. Specific deficiencies in the electrical distribution and fire protection systems identified by the reviews were provided to DOE; these were addressed by coordination studies applicable to protective devices, anticipated electrical system upgrades, and a consolidated fire hazards analysis.

Systems Engineering at the Hanford Site

In Recommendation 92-4, the Board pressed DOE to commit to systematic management of the Hanford Multi-function Waste Tank Facility (MWTF) project because of indications that the Department was proceeding with the project without adequately addressing all health and safety design criteria for the full life cycle of the facility. In response, DOE committed to take a systems engineering approach to the design of the MWTF, and to perform independent design reviews, starting with an overall System Requirements Review (SRR) for the Tank Waste Remediation System (TWRS).

This SRR, performed by an independent group and led by representatives from DOE Headquarters, identified significant risks and uncertainties associated with the project. As the Board had independently determined, the SRR team found that health and safety requirements including those related to end state criteria and final waste form had not been adequately defined even though a project baseline had been assumed. Selections of alternatives had been made without adequate justification from performance and safety perspectives. As a result of the SRR, DOE-RL and its contractors are working toward more systematically identifying the systems functions and requirements, including those requirements related to health and safety.

D. SAFELY MANAGING SURPLUS NUCLEAR MATERIAL AND WASTE

Stabilization of Fissionable Residues at the Rocky Flats Environmental Technology Site

In Recommendation 94-1, the Board recommended that DOE expedite its efforts to characterize and stabilize a wide variety of production residues remaining in process lines and storage containers which were continuing to degrade, creating an increasing hazard. Although the problem exists at several facilities in the defense nuclear complex, it is especially acute at the Rocky Flats Evironmental Technology Site (RFETS).

During the summer of 1995, impure material remaining from metal casting, which constituted one of the highest risk sources of plutonium-bearing residues at RFETS, was successfully stabilized. In addition, by mid-November 1995, plutonium metal in contact with plastic at RFETS had been repackaged in accordance with DOE's implementation plan. Moreover, processing and safe interim storage of other plutonium residues and oxides are proceeding, albeit not on the schedule set forth in DOE's implementation plan.

Nuclear Material Stabilization at the Savannah River Site

At the Savannah River Site, Recommendation 94-1 applies to stabilization of solutions containing plutonium and trans-plutonium elements in F-Canyon, plutonium metal in storage, and irradiated fuel and target assemblies in basins. In accordance with its implementation plan, DOE has expedited processing of plutonium solutions in F-Canyon and FB-Line, in addition to reassessing its earlier plans for deteriorating fuel and target material.

As part of the material stabilization effort, the Board has insisted that each facility to be used for stabilization undergo a thorough Operational Readiness Review, including reviews of operator training and procedures, verification of equipment operability, and definition and control of the facility's authorization basis. This process has resulted in: (1) augmented steps to protect against radioactive material release, including the isolation of an F-Canyon tank that contains highly radioactive americium and curium; (2) modifications to the FB-Line ventilation system to provide exhaust filtration through a sand filter; (3) additional controls in F-Canyon and H-Canyon to prevent an explosion similar to the accident at the Tomsk facility in the former USSR; and (4) reductions in the size and number of contaminated areas in both F-Canyon and the FB-line.

Spent Nuclear Fuel at the Savannah River Site

In Recommendation 94-1, the Board urged DOE to expedite processing of deteriorating reactor fuel stored in basins at the Savannah River Site. In its implementation plan, DOE committed to begin stabilizing this aluminum-clad highly-enriched fuel by November 1996. Subsequently, DOE announced plans to continue to store the material in water basins and to conduct additional studies of the feasibility of dry storage.

The Board and its staff identified problems with pursuing dry storage plans for aluminum-clad highly-enriched uranium fuel, and pointed out certain rapidly corroding nondefense fuel that had been previously predicted by DOE to remain stable for another ten years. In a subsequent technical report, DNFSB/TECH-7, *Stabilization of Deteriorating Mark 16 and Mark 22 Aluminum-Alloy Spent Nuclear Fuel at the Savannah River Site,* the Board established the technical basis for concluding that stabilization of this fuel by chemical separation is the better alternative.

The Board's attention to this matter caused DOE to refocus its previous dry storage plans, and, as a consequence, DOE now is examining means to expedite conversion of the fuel into more manageable components (i.e., feed for the Defense Waste Processing Facility and low-enriched uranium).

In addition, had the Board not alerted DOE to the rapidly corroding but incorrectly categorized fuel, it is likely that DOE would have continued wet storage, based on its assumption of stability for at least the next decade. In response to the Board's findings, DOE rapidly made plans to remove this fuel from wet storage and to stabilize it by chemical processing. Only weeks after these revised plans were initiated, this fuel demonstrated its lack of stability under the prevailing conditions of accelerated chemical attack and corrosion in wet storage by having one of its storage containers rupture.

Spent Nuclear Fuel Stored in the K-Basins at the Hanford Site

At the beginning of 1994, DOE pursued a vaguely defined course of action to resolve recognized safety issues with severely deteriorated spent fuel stored in leaking basins located next to the Columbia River. A Tri-Party Agreement involving DOE, the Environmental Protection Agency, and the State of Washington had been reached to remove the fuel from the basins by the end of the year 2002. DOE-HQ expressed reservations about the feasibility of meeting the agreed-upon completion date. Meanwhile, the contractor expended considerable resources, but made little progress, on an interim effort to encapsulate (in the basin water) all of the fuel in the K-East Basin.

In early 1994, the Board pointed out the lack of a technical basis for DOE's planned course of action and urged DOE to identify engineering alternatives, the criteria for selecting an alternative, and the anticipated radiological consequences of proposed actions. In May 1994, the Board issued Recommendation 94-1, specifically recommending that the program be accelerated to place the deteriorating reactor fuel in a stable configuration for interim storage until an option for ultimate disposition is chosen.

As a result of intense interactions between DOE and the Board and its technical staff, DOE's implementation plan committed to begin fuel removal by the end of 1997, and to complete fuel removal by December 1999. In addition, this implementation plan reflected results of recently performed engineering studies identifying stabilized dry storage as the best interim storage for the type of fuel stored in the K-Basin.

The Board's involvement with these issues resulted in a technically sound path forward and an expedited schedule for resolving the safety and environmental vulnerabilities associated with the leaking fuel. The Board was instrumental in steering both the contractor and DOE toward a system where all activities associated with the stabilization of the fuel in the K-Basins were conducted on a separate project basis. The Board has since continued to apply pressure to ensure timely implementation of this path forward.

Integrity of Cesium and Strontium Capsules at the Hanford Site

The B-Plant/Waste Encapsulation and Storage Facility (WESF) at the Hanford Site contains about 1900 metal capsules containing radioactive cesium and strontium which are stored underwater. The material, which was extracted from high level waste and sealed in the double-encapsulated metal containers between 1974 and 1985, contains about 73 million curies - about one-third of the total inventory of radioactive material at the Hanford Site.

The capsules are currently intact, but confinement must be maintained until the capsules are removed from the facility, and final disposition may not occur for another twenty years. During the coming year, the Board and its staff will continue to review the long-term integrity of the capsules, the integrity of the storage pools, and the capability to detect and handle a leaking container. Through its staff, the Board is also reviewing the authorization basis of the facility. These reviews are expected to continue into FY 1997, and beyond.

Adequacy of Nuclear Material Storage Conditions at the Oak Ridge Y-12 Plant

At the Y-12 Plant, the nation's repository for Highly Enriched Uranium (HEU), DOE plans to consolidate much of the HEU from other sites in the complex. This will involve receipt, processing, and storage of uranium in many different forms. Historically, no standard existed for uranium storage. This past summer, DOE approved a standard for storing HEU at the Y-12 Plant. The Board and its technical staff played a key role in the creation of this standard through on-site reviews and detailed technical comments on the initial drafts.

Cylinders Containing Depleted Uranium at the Gaseous Diffusion Plants

Approximately 50,000 cylinders containing more than 500,000 metric tons of depleted uranium hexafluoride (UF_6) remaining from the production of enriched uranium for both defense and civilian purposes are in outdoor storage at the three gaseous diffusion plants in Oak Ridge, Tennessee; Portsmouth, Ohio; and Paducah, Kentucky. In early 1995, the Board and its staff reviewed the safety of these cylinders, following up on information indicating that poor maintenance and storage conditions had led to severe corrosion and breaching of several cylinders. The Board found that the corrosion-resistant coatings of the cylinders had not been maintained and that many cylinders were handled and stored under conditions that could lead to high deterioration rates.

To protect against further cylinder breaches and the resulting potential for dispersion to the environment of large amounts of UF_6, the Board issued Recommendation 95-1 in May 1995, urging DOE to address the problem promptly. The Secretary of Energy accepted the Board's Recommendation and submitted an acceptable implementation plan in October 1995. DOE committed to: (1) address severely degraded cylinders expeditiously; (2) start a program to renew protective coatings on cylinders; (3) investigate other measures to protect cylinders; and (4) complete a full evaluation of cylinder storage hazards. The Board will continue to closely monitor these efforts during 1996.

High-Level Waste Storage Tanks at the Hanford Site - Ferrocyanide Hazards

During the first year of its existence, the Board identified the storage tanks for high level radioactive waste at the Hanford site as one of the most serious hazards in the defense nuclear complex, and gave the tank farms its immediate close attention. One of the hazards of particular concern was the suspected accumulation of potentially explosive concentrations of ferrocyanide compounds in the tanks.

Late in 1990, the Board issued Recommendation 90-7, urging DOE to improve significantly the monitoring, modeling, characterization, and emergency preparedness for those high-level waste tanks believed to contain ferrocyanide compounds. In its implementation plan, DOE committed to upgrade instrumentation in the tanks, greatly accelerate efforts to characterize the tank wastes and vapors, and conduct a focused investigation into the properties of simulated wastes.

Spurred by the Board's recommendation, DOE and its contractors at Hanford researched and investigated this issue and produced substantial evidence that during the decades of high-level waste storage, the ferrocyanides have degraded to the point that they are now present in relatively harmless concentrations, thus relieving a major safety issue. DOE is expected to complete the work needed to close this issue permanently in the coming year.

High-Level Waste Storage Tanks at the Hanford Site - Characterization of Tank Contents

In Recommendation 93-5, the Board exhorted DOE to substantially improve and accelerate characterization of high-level waste in tanks at the Hanford Site. In response, DOE committed to improve its management and conduct of the characterization program, to greatly accelerate the sampling rate, and to ensure the timely completion of sampling and associated analyses needed by the tank safety and waste disposal programs.

DOE and its contractors have struggled with the tank sampling and characterization program. The result is that the characterization effort has not progressed at the planned rate. However, a number of significant improvements have resulted from DOE's efforts to implement the Board's recommendation. The needs of the safety program have been identified, and laboratory analyses critical to safety are evaluated and reported more rapidly than they had been before the Board emphasized the seriousness of the issues. In addition, efforts to define information needs have led to an improved understanding of the tank safety issues. In addition, these efforts have led to a recognition that substantial uncertainties remain about waste tank safety. DOE has responded by expanding safety-related controls on tank farm operations, a precaution intended to reduce the likelihood of a tank accident.

Neutralization of Residual Production Materials at the Fernald Environmental Management Project

In Recommendation 93-4, the Board recommended that DOE develop and implement a plan for technical management of the contractor for the Fernald Environmental Management Project, and to develop a clear plan and authorization basis for the neutralization of 200,000 gallons of uranyl nitrate hexahydrate (UNH). In accordance with its implementation plan, DOE developed a technical management plan identifying the responsibilities of DOE personnel involved in management of the contractor. As a result, the UNH program was substantially improved. Modifications to the process were made, disciplined conduct of operations principles were implemented, and detailed formalized procedures were developed. With these improvements, the entire UNH inventory and a smaller amount of thorium nitrate solution were safely neutralized.

Implementation of Recommendation 94-2 - Improving DOE's Low-Level Waste Program

Recommendation 94-2, issued in September 1994, called for a complex-wide review of DOE's low-level radioactive waste (LLW) program to establish the dimensions of the LLW problem and identify suitable corrective actions. DOE's implementation plan organized efforts into six areas: (1) systems engineering, (2) a complex wide vulnerabilities assessment, (3) a study of DOE LLW regulatory structure and process, (4) LLW performance assessments, (5) LLW projections, and (6) research and development associated with LLW disposal.

Originally, the implementation plan called for work to be completed by August 1997, with most activities completed by late1996. DOE has made little progress, however, toward achievement of this schedule. Instead, DOE has directed its efforts toward reassessing existing commitments and formulating a new strategy that is more consistent with available funds and technical resources.

Key technical issues remaining to be resolved include:

- bounding DOE's low-level waste program in a manner that is consistent with DOE's needs;
- development of a sound technical strategy for reflecting composite radionuclide source terms in LLW performance assessments;
- revision of DOE Order 5820.2A, *Radioactive Waste Management*, to include the commitments in DOE's implementation plan; and
- delays in formulating a LLW policy consistent with low-level waste projections and capacity in terms of both volume and radionuclide loading.

Overall, DOE misjudged the technical complexity of implementing this recommendation and is in the process of determining what resources and strategies are necessary to resolve fundamental issues. The Board is following these efforts with keen interest, to ensure that DOE's selection of alternatives is consistent with the Board's intent.

E. SAFETY ASPECTS OF NUCLEAR WEAPONS STOCKPILE STEWARDSHIP AND MANAGEMENT

Oversight of Stockpile Stewardship and Management Activities at the Nevada Test Site

During 1995, DOE conducted several test readiness exercises and activities at the Nevada Test Site (NTS). The Board oversaw the first high-explosive experiment conducted in a new underground facility and other experiments that exercised safety-critical skills needed for nuclear testing operations. In addition, the Board Members traveled to NTS in November 1995, where they obtained firsthand information on a variety of experimental activities being conducted in support of DOE's Stockpile Stewardship and Management Program; the status of the new Device Assembly Facility; and the archiving efforts related to Recommendation 93-6 being performed by the Nevada Operations Office/Joint Test Organization. The Board also examined the LYNER underground experimental facility.

Disparity in Applicability of Orders

The Board issued Recommendation 93-1, *Standards Utilization in Defense Nuclear Facilities,* in early 1993, recommending that DOE address the differences between the safety requirements applicable to nuclear explosives facilities and those applicable to other defense nuclear facilities. In 1994, DOE completed its analysis and developed a plan to improve the set of DOE orders applicable to nuclear explosives facilities, and to take corrective actions in sixteen functional areas. The Department planned to "adopt by reference" nine previously excluded DOE orders as the cornerstone of its corrective actions. Additionally, DOE had agreed to review standards currently applicable to nuclear explosives facilities and to develop additional standards, as needed.

The Board is encouraged by DOE's commitment to extend the applicability of nuclear safety orders and to increase the set of DOE safety standards applicable to nuclear explosive operations.

Implementation of Recommendation 93-1/NESS CAP

In its implementation plan for Recommendation 93-1, *Standards Utilization in Defense Nuclear Facilities*, and the associated Nuclear Explosive Safety Study Corrective Action Plan (NESS CAP), DOE made commitments to complete five major actions. Three of the five actions have been completed and subsequently accepted by the Board.

The Board currently is having its technical staff evaluate one of the remaining tasks concerning the revision of orders applicable to facilities involved in assembly, disassembly, and testing of nuclear explosives. The current drafts of the new orders represent quantum improvements over the existing orders; however, some significant issues remain. For example, the revised orders do not include the previous requirement to conduct a quantitative risk assessment of plutonium dispersal during Nuclear Explosive Safety Studies. In addition, several of the previously-excluded nuclear safety orders DOE has committed to "adopt by reference" are only partially invoked in the revised orders. At the end of the year, the Board's staff was continuing to work with its DOE counterparts to address these issues.

DOE's Albuquerque Operations Office (DOE-AL) is reviewing all of its Supplemental Directives (AL-SDs), with the aim of eliminating as many as possible. These directives provide detailed guidance for safety of nuclear explosive activities conducted at the Pantex Plant. The Board intends to follow this activity closely to ensure that safety of nuclear explosive operations at the Pantex Plant is not compromised.

In response to Recommendation 93-1, DOE has been working to expedite and upgrade Order Compliance Self-Assessments (OCSA) at the following five sites: the Pantex Plant, the Los Alamos National Laboratory, the Lawrence Livermore National Laboratory, the Oak Ridge Y-12 Plant, and the Nevada Test Site. This effort has significantly enhanced the use of standards that affect nuclear explosive safety. During the thirty months since the Board accepted DOE's implementation plan for Recommendation 93-1, other initiatives to define, control, and implement safety requirements have also been underway. A summary of each site's work completed or planned is included below:

- The Pantex Plant is expected to complete a revised site-level OCSA in the first quarter of 1996. Development of an "Essential Standards Program" that will include SRIDs and compliance assessments has been initiated by the management and operating contractor.

- At Oak Ridge, revised OCSAs have been completed for site-level and Buildings 9212 and 9720-5 SRIDs at the Y-12 Plant.

- The three nuclear design laboratories are working together to develop integrated safety management programs for research and development activities.

- DOE committed to verify order compliance prior to conducting its operational readiness review (ORR) for the Device Assembly Facility at NTS.

Implementation of Recommendation 93-6

In its implementation plan for Recommendation 93-6, "*Maintaining Access to Nuclear Weapons Expertise in the Defense Nuclear Facilities Complex*," DOE committed to retain access to and capture the unique, and as yet undocumented knowledge of individuals who had been engaged for many years in the assembly, disassembly, and testing of nuclear weapons.

DOE's execution of the approved implementation plan was problematic from the start. Some efforts were made in certain areas, but little progress in completing several key commitments was evident by the spring of 1995. The commitment to establish an ongoing program to identify and capture skills and knowledge was several months overdue, due to the lack of integrated technical guidance and coordination. Efforts to remove administrative obstacles to gaining needed access to retirees for archiving purposes were stalled. The commitment to establish processes for development of safe dismantlement and modification procedures for the Pantex Plant, originally due in October 1994, had not been completed six months after that date. DOE's assertion that the existing stockpile surveillance program addressed the Board's concerns on hazards from the degradation of remaining weapons and the potential impact on weapon operations was not supported by the description of this program provided as a deliverable under the implementation plan.

On April 5, 1995, the Board wrote to the Secretary of Energy expressing these concerns about Recommendation 93-6 implementation. The letter stated the Board's position that:

> " . . . the delay in completing these and other important commitments has jeopardized the overall schedule and effectiveness of the DOE's implementation of Board Recommendation 93-6. These delays continue to indicate that the necessary level of management attention at DOE Headquarters, field offices, and contractors organizations is not being applied in meeting the commitments to the Board."

The Board asked to be informed of additional actions DOE planned to take to address the identified implementation deficiencies and to minimize further adverse impact to the overall implementation of Recommendation 93-6.

The Board received the Department's response to the April 5 letter on July 7. This response committed to develop a revised Implementation Plan for Recommendation 93-6. However, this response, which came three months after the Board's letter, only committed to having the Defense Program organization draft an Implementation Plan revision by the time another month had passed. As of the end of 1995, DOE had failed to provide a revised Implementation Plan for Recommendation 93-6 for Board consideration and acceptance. The Department's performance in this important form of formal interaction with the Board has been poor. However, despite the problems discussed above, DOE field and contractor efforts to implement the intent of Board Recommendation 93-6 made significant progress in 1995.

While revision of the Implementation Plan was in progress, the Nevada Operations Office (NVOO) effectively completed all commitments under both the old Implementation Plan and the revised Plan under consideration. This included completion of Job Task Analyses (JTAs) for all key positions involved with the critical safety activities, functions, and operations for nuclear testing. An evaluation was completed on the reliance on traditional administrative controls for nuclear explosive safety in testing operations. A knowledge, skill, and experience archiving program has been developed and is being actively implemented. NVOO has formally institutionalized an annual adequacy assessment of critical functional areas, key positions, JTAs, and personnel. NVOO personnel involved in Recommendation 93-6 implementation should be commended for their high degree of independent initiative.

A "Knowledge Preservation Program" involving both the Y-12 Plant and the DOE Oak Ridge Operations Office was developed and was being implemented at year-end, in anticipation of completion of the revised implementation plan.

Progress was less evident for those elements of the Recommendation involving operations at the Pantex Plant, which come under the cognizance of the Albuquerque Operations Office. A Board briefing on the status of the weapons laboratories' archiving programs in late May showed little evidence of progress in capturing the undocumented safety-related skills and knowledge of departing weapons program personnel. In response to the Board's expressed concerns, DOE issued additional explicit instructions to the laboratories; by year-end there was evidence of more activity on both the DOE side and at the laboratories.

Improvements at the Pantex Plant

The Board's activities have initiated or provided significant contributions to a number of achievements at the Pantex Plant during the last year:

Reduced Risk due to Aircraft Overflights

Due in large part to the Board's intensive review of the aircraft crash analysis for the Pantex Plant, an Overflight Working Group, chaired by DOE and including representatives from the City of Amarillo, the Federal Aviation Administration (FAA), and the United States Air Force (USAF), was chartered to assess the feasibility of moving air traffic away from the plant. Based on the recommendations of this working group, DOE has funded the FAA to upgrade navigational aids at the Amarillo International Airport. The FAA has completed engineering design studies and expects to complete in late 1996 the construction of a precision approach to Runway 22. Eventually, most flights over the Pantex Plant will be eliminated, thereby reducing significantly the risk of an aircraft crash at the site. Additionally, DOE has discussed the safety implications of aircraft overflights of the Pantex Plant with representatives from neighboring USAF bases whose aircraft use the Amarillo runway for pilot training. The Air Force commanders have issued safety bulletins to their aircraft squadrons that will help reduce the number of overflights of the Pantex Plant.

Improved Technical Staffing in the Amarillo Area Office

On July 20, 1994, the Board wrote to DOE concerning the paucity of technically competent personnel on the DOE Amarillo Area Office (AAO) staff. This deficiency had resulted in delays in implementing nuclear safety requirements, as well as a general inability to ensure the contractor's readiness to proceed with new nuclear weapons activities. The Board urged DOE to place the highest priority on upgrading the staffing of AAO with the correct mix and quantity of technically qualified personnel. Because of the Board's efforts, technically competent engineering professionals were hired, many with strong nuclear industry experience. This enhancement of technical competence of the AAO staff has yielded substantial improvements in operations at the Pantex Plant in the areas of analysis, documentation and control of the safety envelope; personnel training and qualification; and control of the nuclear weapon dismantlement process.

Readiness to Begin Weapons Assembly/Disassembly Operations

The Board and its staff have been reviewing implementation of the DOE process used to confirm readiness to conduct nuclear weapons assembly, disassembly, and surveillance operations at the Pantex Plant. This process was developed partially in response to Recommendation 92-6, *Operational Readiness Reviews*. The Board is encouraged by the increased involvement of personnel from the National Laboratories in the review of readiness to begin operations. However, the Board's review of DOE's efforts to start operations on a number of weapon systems revealed deficiencies with implementation of the process. For example, reviews were being utilized more as a technical assistance visit by the Laboratories, than as a final independent assessment of operational readiness. In January 1995, the Board asked DOE to address certain issues and identify actions to improve the readiness process and its implementation. In response to the reporting requirement, and at DOE's direction, the Pantex Plant has improved its line management ability to assure readiness and is incorporating improved guidance for the independent review processes.

Improved Conduct of Operations and Use of Standards

During the past year, in response to Board Recommendations on standards and reporting requirements concerning conduct of operations, DOE and the Pantex Plant management and operating contractor have improved the use of procedures, thereby greatly improving the formality of operations at the plant. AAO has developed a set of operating procedures to standardize area office functions. These procedures capture requirements from DOE orders and other guidance to ensure the AAO staff fulfills all its responsibilities. The contractor also has improved its use of standards during the last year to control operations more formally. Examples of these improvements include a standardized process for writing Nuclear Explosive Operating Procedures, standardized review criteria, methods for self-assessments, and improved maintenance surveillance procedures. DOE-AL directives require verbatim compliance with approved procedures; however, the Board continues to identify numerous cases in which procedures are not followed or cannot be followed as written. This matter will receive close attention from the Board's site representatives and other staff members during 1996.

New and Upgraded Safety Analyses

The Board has had a significant impact on the efforts to upgrade safety analyses at the Pantex Plant. Its reviews have ensured consistency between the safety analyses being performed for the site-wide Environmental Impact Statement (EIS) and the facility Safety Analysis Reports (SARs). The Board has also closely reviewed the technical adequacy of the Basis for Interim Operations and the rigor of the bounding accident analysis. This focused review by the Board has helped ensure that the safety analyses being developed are complete and technically sound. A draft site-wide EIS and SAR's for the Assembly/Disassembly Bay and Cell are expected to be completed in 1996. These efforts to upgrade safety analyses have led to the identification of several Unreviewed Safety Questions at the Pantex Plant. For example, additional analysis and controls were required to improve the safety of tritium storage and of cell operations so as to assure that an explosion would not cause radioactive material to be released from the building.

Design and Safety Basis for the New Special Nuclear Material Staging Facility

The Special Nuclear Material (SNM) Component Staging Facility at the Pantex Plant (Building 12-116) was designed in 1988; construction was completed in 1993. However, the facility has never been operated, primarily because of shifting mission requirements and the need to correct design and construction discrepancies. The facility, which is expected to have new equipment backfitted during the next two years and to become operational in 1998, will be used to consolidate staging, inspection, and packaging operations for strategic reserve components.

During the latter half of 1995, the Board initiated a systematic review of this facility, focusing particularly on design characteristics that establish the nuclear safety envelope. These characteristics are expected to form a significant part of the authorization basis for the facility. The ongoing review by the Board is to identify hazards and appropriate accident scenarios for the facility, and to determine whether safety-related Structures, Systems and Components (SSCs) provide the requisite defense-in-depth. In addition, the review will examine standards, tests, analyses, and independent design reviews used in the design of the SSCs. The review, which is scheduled for completion by mid1996, is designed to provide early identification of potential facility safety problems and to allow DOE up to six months to resolve any problems prior to the anticipated start of backfit construction.

Conduct of Operations and Criticality Safety at the Y-12 Plant, Oak Ridge

In September 1994, in response to numerous violations of criticality safety and weaknesses in disciplined operations identified by its staff, the Board issued Recommendation 94-4, *Deficiencies in Criticality Safety at the Oak Ridge Y-12 Plant.* This recommendation discussed observed weaknesses in operator discipline and in criticality safety programs, as well as in the adequacy of DOE and contractor experience, training, and performance. Based on the Board's observations, DOE suspended operations at the Y-12 plant, pending development of an implementation plan. Both DOE and its contractor have since undertaken a number of initiatives to prepare the Y-12 facilities for resumption of operations, in accordance with DOE's implementation plan.

DOE's course of action for resumption of operations was to take immediate steps to correct safety deficiencies and then validate them through a formal restart process in accordance with DOE 5480.31, *Startup and Restart of Nuclear Facilities*. Three mission areas have been restarted successfully. Disassembly and assembly operations are projected to be restarted in the spring of 1996 and enriched uranium operations are scheduled to resume in 1997. In addition, within months of the Board's issuance of Recommendation 94-4, the DOE Y-12 Site Office was able to add eight new, technically competent personnel. These individuals have technical degrees and extensive nuclear backgrounds.

Several other independent DOE functional area assessments (training, conduct of operations, and criticality safety) have been performed in accordance with commitments in DOE's 94-4 Implementation Plan. Each of these assessments found that, in general, significant progress had been made in the past year as a direct result of activities associated with Recommendation 94-4. The training area assessment made note of the technical competence of key DOE personnel at the Y-12 Plant, stating, "The base level of Federal personnel technical expertise and competency at the Y-12 Plant site has significantly increased since the September 1994 event." The evaluators also noted that continued progress is still required in those areas that have been restarted, and that significant work is needed in other areas where restart has not occurred.

Project Sapphire - Receipt and Handling of Highly Enriched Uranium from the former Soviet Union

During the period November 1994 through October 1995, the Board provided safety oversight of activities involving "Project Sapphire" materials at the Oak Ridge Y-12 Plant. In November 1994, Project Sapphire personnel transported approximately 600 kilograms of Highly Enriched Uranium (HEU) from a nuclear facility in the Former Soviet Union State of Kazakhstan to Dover Air Force Base, in Delaware. After arrival at Dover, the material was shipped to the Y-12 Plant, where it was received and placed into interim storage by the Y-12 personnel. DOE next began negotiating with private vendors for the sale of the material, for the purpose of eventual blending the material down for commercial reactor fuel. The final shipment of Project Sapphire material was made from the Y-12 Plant in October 1995.

The Project Sapphire material was received, stored, and reshipped from the Y-12 Plant in a safe manner. However, Board oversight did identify areas for improvement that should be considered for similar initiatives, should any become necessary. During Board staff reviews conducted prior to shipment to the Y-12 Plant, it appeared that the Project Sapphire material had not been sufficiently characterized to conclude that it complied with Y-12 standards for storage of HEU. In addition, adequate hazards analysis and unreviewed safety question screening were not accomplished prior to receipt of the material to determine if the special operation was actually within the safety authorization basis for the facility. Although DOE eventually developed an adequate sampling plan, the necessary additional sampling and characterization were never accomplished. DOE decided to allow the characterization and subsequent processing to be accomplished after shipment to the vendor's facility.

Control of the Authorization Basis for a Nuclear Research and Development Facility

The primary mission of the Plutonium Facility at the Lawrence Livermore National Laboratory (LLNL) involves the conduct of plutonium research and development activities associated with the DOE Stockpile Stewardship and Management program. During a 1994 review of the facility, the Board's staff noted the absence of facility operating limits on which the newly approved final Safety Analysis Report (SAR) is to be based. LLNL had failed to meet surveillance requirements established by the SAR to ensure operability of safety systems, such as emergency power, fire protection, and ventilation. After the Board identified these deficiencies to both DOE and laboratory personnel, LLNL placed the facility in administrative standby and normal nuclear operations were curtailed.

Before resuming operations in late 1995, LLNL required approximately six months to rewrite many of the Technical Safety Requirements. After additional analysis, training, and procedure writing efforts, the newly implemented safety improvements were validated through a successful formal restart process in accordance with DOE Order 5480.31, *Startup and Restart of Nuclear Facilities*.

Reservoir Unloading at the Mound Laboratory

The Mound Laboratory is currently involved in the safe shutdown and decommissioning of facilities formerly used for the production, repackaging and offsite shipment of nuclear materials, and the cleanup of nuclear waste. The Board has followed closely DOE's project for unloading more than 500 special tritium reservoir units at the Mound Laboratory. Review of the project disclosed that DOE had not completed appropriate readiness reviews for the proposed operations. Subsequent readiness reviews by DOE and the contractor for Mound Laboratory contractor confirmed deficiencies in radiation protection, training, and surveillance requirements. Action plans were developed to correct these deficiencies, and the unloading of the reservoirs began in late 1995.

F. SAFETY ASPECTS OF DECOMMISSIONING DEFENSE NUCLEAR FACILITIES

At the present time, as required by its statutory charter, the Board is following deactivation and decommissioning activities at the Rocky Flats Environmental Technology Site (RFETS) and the Hanford Site -- two locations DOE has selected for priority attention. At RFETS, work is underway to develop new methods for deactivation and decommissioning of facilities and to streamline processes that would permit the site to be decommissioned much more rapidly than the ten-year span that had previously been projected. At the Hanford Site, DOE has identified the UO_3 facility and the PUREX Deactivation Projects as models for the development of common deactivation practices. In addition, DOE has identified C-Reactor at the Hanford Site as the centerpiece of a large-scale demonstration project for development of new decommissioning technologies, including placement of the reactor in a cocoon[13].

Decommissioning Memorandum of Agreement Concerning the Rocky Flats Environmental Technology Site

The Board's statutory assignment includes the responsibility to review the adequacy of DOE's safety standards and their implementation in the design, construction, operation and decommissioning of defense nuclear facilities. Decommissioning of such facilities commences in earnest when DOE determines they are no longer needed for support of the weapons program and they are scheduled for decontamination and eventual dismantlement.

On the basis of understandings with the Environmental Protection Agency (EPA) and associated State authorities, DOE is proceeding to decontaminate excess facilities to the extent required to maintain and monitor them safely until they can be dismantled, and environmental restoration can be accomplished under provisions of the Resource Conservation and Recovery Act (RCRA) or the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as may be appropriate. Provisions of those statutes bring such actions under the oversight of EPA and/or the affected states.

The Board has been working with DOE, EPA, and the State of Colorado to fashion an agreement on how best to bring their respective oversight and regulatory authorities to bear on cleanup of RFETS, to facilitate DOE's cleanup effort. This effort has been progressing well and the principals hope to have a cooperative agreement in place in early 1996. The Board plans similar dialogues with Federal and State authorities having jurisdiction over decommissioning activities at other DOE sites.

Deactivating the UO_3 Facility at the Hanford Site

The UO_3 facility was formerly used to convert uranyl nitrate hexahydrate (UNH) solution from the PUREX Plant into solid UO_3 powder. The facility's last operating campaign was completed in June 1993, after which deactivation began immediately.

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[13] This involves extending all reactor shield walls to the same height, and adding a new concrete roof over the reactor; modifying the reactor building to seal all penetrations and most other building access points; removing all ancillary buildings and structures; and allowing only infrequent and limited access to the facility for periodic inspection.

The purpose of the UO_3 facility deactivation project was to establish a passively safe and environmentally secure configuration and to preserve that configuration for up to 10 years. DOE considers the project to be completed. Currently, the plant is unoccupied and devoid of portable equipment and furniture. In its stabilized condition, nearly all the radioactive or hazardous materials have been removed. Only minimal effort is required for Surveillance and Maintenance (S&M) activities. All process equipment, instrumentation, and systems for heating, ventilation and air conditioning are shut down. The building doors and gates in the perimeter fence are locked to limit access. The facility is entered only for quarterly surveillance visits or to correct deficiencies identified during previous surveillance entries.

Deactivating the PUREX Facility at the Hanford Site

The PUREX facility processed irradiated fuel from the Hanford production reactors for the recovery of plutonium and uranium between 1956 and 1972. It was restarted in 1983, and continued to operate until 1990. DOE intends that the PUREX facility follows a deactivation process similar to that used at the UO_3 plant.

The Board's primary focus at both the UO_3 and PUREX facilities will be to ensure that DOE's deactivation and decommissioning methods provide adequate protection of the health and safety of workers and the public, and the protection of the environment. Board attention is currently focused on DOE's planning for transition from deactivation to decommissioning to ensure that later stages also provide adequate protection.

Decommissioning of C-Reactor at the Hanford Site

The C-Reactor is a surplus production reactor that was originally scheduled to be the first of eight to be dismantled at the Hanford Site. In lieu of dismantling, DOE now intends to place the C-Reactor in a cocoon for an extended period of up to 75 years before dismantlement is completed. DOE expects that this approach will constitute a safe storage mode during this long waiting period and reduce risks and costs of prolonged maintenance. In addition, DOE believes that the use of a cocoon for the C-Reactor could provide technology improvements to reduce cost, improve safety, and lessen environmental liabilities within the DOE complex. Technologies developed at the C-Reactor could be transferred quickly to other Hanford facilities, where seven other similar reactors and dozens of other large facilities require action, as well as to facilities elsewhere in the defense complex.

The Board intends to continue to focus its attention on ensuring that the technologies developed for the long-term storage of the C-Reactor are adequate for maintaining the safety of the facility throughout the storage period.

Deactivation and Decommissioning of the Rocky Flats Environmental Technology Site

The Rocky Flats Environmental Technology Site , constructed in the early 1950s, had as its primary mission the production of nuclear weapon components. This mission included manufacture of specific weapon components and chemical recovery of plutonium from residues and scrap. In early 1993, DOE canceled all plans for production of nuclear weapon components at RFETS and changed the primary mission of RFETS to one involving area cleanup, elimination of residues that had accumulated, interim storage of materials until they can be shipped to their final location, and removal of excess facilities. In order to accomplish these activities, the integrating contractor at RFETS is exploring alternatives to the previously identified sequencing of plant decommissioning.

The Board is following closely the development of deactivation and decommissioning plans to ensure the safety of workers and the public, and the protection of the environment.

III. ADMINISTRATIVE MATTERS

A. PERSONNEL RECRUITMENT

As of December 31, 1995, the Board had a staff of 98 full-time employees, including two full-time Site Representatives at the Department of Energy's Pantex Plant, near Amarillo, Texas; one Site Representative at the Hanford Site, in Richland, Washington; and two site representatives at the Rocky Flats Environmental Technology Site, near Denver, Colorado.

The highly technical mission of the Board requires staff of the highest scientific and technical caliber with demonstrated competencies in all major phases of nuclear safety. The Board's technical staff includes individuals with extensive backgrounds in nuclear, mechanical, electrical, chemical, structural, and metallurgical engineering; and physics. As an indication of the Board's technical talent, 20 percent of the technical staff hold degrees at the Ph.D. level and an additional 64 percent have Masters degrees. Moreover, almost all technical staff members, except interns, possess practical nuclear experience gained from duty in the U.S. Navy's nuclear propulsion program, the nuclear weapon field, or the civilian reactor industry. Five other senior members of the Board's staff have law degrees (JD), in addition to degrees in a technical specialty. Both the Board and its staff include persons experienced in environmental impact assessments and regulatory processes.

This staff expertise is supplemented on occasions when special technical expertise is needed by outside experts with extensive experience with plutonium processing and weapons assembly and disassembly, and other nuclear operations. Since the limited staff size precludes its ability to cover all scientific matters by means of in-house specialists, the Board contracts for specialized technical expertise as needed. Guiding the work of its technical staff and outside experts and utilizing their individual specialized knowledge and capabilities has enabled the Board to make its own technical judgements forming the basis of its recommendations and related actions.

Through its technical intern program, the Board has continued to recruit and develop a select group of the Nation's top engineering graduates. Currently, six interns are in various phases of a three-year training program encompassing formal graduate school education and on-the-job training. The recruitment and selection methods used have proven very effective, based on the outstanding academic and on-the-job performance of the five staff members that have already completed the intern program. Board staffing projections include the recruitment of five technical interns in 1996.

B. OFFICIAL SITE VISITS BY BOARD MEMBERS AND BY STAFF

From the establishment of the Board in October 1989, through December 31, 1995, Members of the Board, its staff, and its contractor experts had collectively made 870 site visits to DOE's defense nuclear facilities. In 1995 alone, 173 site visits were made to DOE's defense nuclear facilities by Board Members, staff, and outside experts. These visits focused primarily on selected facilities that both the Board and DOE consider to be most pressing in light of DOE's mission. Where appropriate, the results of staff visits were conveyed formally to DOE managers as trip reports.

During its visits, the Board reviewed firsthand the health and safety issues at each of these sites. The Board also gathered information relevant to its recommendations to the Secretary of Energy and observed their implementation.

C. PUBLIC INTERACTION WITH THE BOARD

The Board continues to be sensitive to the need for public involvement and awareness of defense nuclear safety issues, and has found public meetings to be very effective tools in encouraging responsiveness on the part of Department representatives, and in exchanging information with state and local officials, labor leaders, DOE facility workers, public interest groups, and area residents. During 1995, the Board conducted five public meetings, hearings, and briefings at or near the following DOE defense nuclear sites:

- Savannah River Site
- Rocky Flats Environmental Technology Site
- Hanford Site -- two meetings
- Lawrence Livermore National Laboratory

During 1995, the Board also held five public meetings at its Washington, D.C. offices where, among other topics, the Board, its technical staff, and outside experts discussed the status of work in the standards area, as well as health and safety reviews at DOE defense nuclear facilities. In addition to these public meetings, members of the Board's staff have provided information briefings to local officials and public interest groups in the vicinity of the Pantex Plant, and the Savannah River, Hanford, and Rocky Flats Environmental Technology Sites, and the Fernald Environmental Management Project.

Notices of such public Board meetings are published in the Federal Register and are mailed to 386 organizations and individuals who have requested to be on the Board's mailing list. In addition, each notice is published three times in several local newspapers serving the communities near the DOE facility involved.

In July 1995, the Board expanded the information available to the public via its Home Page on the World Wide Web[14]. The Home Page includes links to, among other things, the entire text of all Board recommendations, the Board's most recent Annual Report, biweekly updates of the log of all correspondence/documents sent or received by the Board, and other background information on the Board's health and safety review activities. This service has been heavily utilized, with more than 22,000 inquiries registered during the month of December 1995 alone .

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[14] http://www.dnfsb.gov

D. NATIONAL PERFORMANCE REVIEW (NPR) STREAMLINING OBJECTIVES

The Board believes that as a new agency, not encumbered by years of bureaucratic rules, regulations, and practices, has already accomplished many of the streamlining objectives of the NPR. At its inception, the Board's executive leadership recognized the importance of carefully structuring an organization to avoid layering, to promote empowerment, and encourage timely action. Using this philosophy, the Board focused its early attention to the following key organizational elements:

Starting Without Encumbrances

As a new agency, the Board did not inherit any staff, organizational structure, or internal regulations governing the conduct of business. Therefore, the Board was free to create a lean organization tailored to its specialized scientific and technical mission, without the encumbrances often associated with traditional government operations such as, vertical layering, excessive administrative support, and duplication of function. The simple structure of the technical staff enables the Board to use technical staff members in an optimum way to deal with each new topic the Board takes up.

Reducing Regulatory Burden

The Board's policy on regulations is fully consistent with the President's memorandum on streamlining the bureaucracy. To date, the Board has promulgated only those regulations necessary to maintain orderly operations -- Freedom of Information Act, Privacy Act, Government in the Sunshine Act, and Organizational and Consultant Conflicts of Interests. Moreover, in promulgating these regulations, the Board has written the rules in ways that achieve the statutory purposes without burdening the Board with inflexibility, or overly-prescriptive requirements that attempt to substitute detailed paperwork for sound judgment.

"Excepted Service" and Pay for Performance

The Board successfully argued for, and subsequently received through legislation and administrative delegations, the means to overcome many of the administrative road blocks that have traditionally frustrated change in government organizations. Most prominent in this list of specific statutory authorities sought by the Board and ultimately granted by the Congress is the "Excepted Service" personnel authority.

The pay banding and pay for performance concepts recommended in the NPR have been operational at the Board for more than four years and have received favorable review by the

General Accounting Office and the Office of Personnel Management. These concepts have proven to be very effective in hiring technical talent, holding employees accountable for their performance, and rewarding outstanding performance on the job.

"No frills" Approach to Operations

From the first day of operation, the Board Members have set the standard for having a "no frills" approach to conducting Board business. Administrative expenses are carefully reviewed for absolute necessity before expenditures are allowed. For example, the Board does not employ chauffers and has no Government automobiles. It carefully enforces the Federal Travel Regulations. These internal policies have been in place since its inception with no adverse impact on operations. Internal directives were written to give practical guidance in the most simplified manner.

Effective Organization Structure

The Board maintains focus on its mission respecting the adequate protection of public and worker health and safety at DOE defense nuclear facilities. Using a matrix form of organization, the Board gained management flexibility and avoided the need to establish layers of middle management that divert limited staff resources from performing health and safety reviews.

Adopting the "economies of scale" philosophy for obtaining needed administrative support services, the Board negotiated Interagency Agreements with the U.S. Nuclear Regulatory Commission, the National Science Foundation, the Public Health Service and the General Services Administration to obtain immediate support for accounting, procurement, personnel, and payroll services. Resources that normally are diverted to these administrative functions remain dedicated to the health and safety mission.

Management Continuity

Under the Board's enabling legislation, the five Members are appointed to staggered five-year terms on a full-time basis. Thus, the Board has enjoyed management continuity and has not been subjected to the disruption resulting from frequent changes in leadership experienced by many government agencies. From the first day of operation, the Board has had precise and consistent direction of the conduct of its technical mission and major policy issues.

Experienced Leadership

Building an organization from its statutory foundation offers a special management challenge requiring individuals with good planning skills, organization skills, and detailed knowledge of a wide range of Federal government policies and practices. The Board successfully recruited a small senior management staff with demonstrated management experience and proven accomplishments.

Using their collective knowledge of government operations, the Board and its senior management staff planned and implemented an organizational structure that maximizes the effectiveness of the scientific and technical resources available and that avoids unnecessary layers of management.

Information Technology

The Board has encouraged the full use of today's advanced computer capabilities by investing in state-of-the-art hardware and software. Staff members use their desk top computers to obtain the latest information on events at defense nuclear sites; review a data base of more than 1.2 million pages of technical documents received by the Board on defense nuclear facilities; access Federal Register notices and legal decisions; and electronically send draft reports to colleagues for review. Expert consultants, engineers on travel, and site representatives send and receive electronic communications through remote access to the Board's local area network.

Accountability vs. Excessive Controls

Small organizations such as this Board cannot afford to waste scarce resources establishing layers of internal management. The Board believes that the foundation for a strong, effective program to prevent fraud, waste, and abuse of government property and funds begins with the line managers responsible for overall program administration.

An independent review of the organization structure and management of the Board conducted by the Institute of Public Administration recognized the significant progress and accomplishments made by the Board in establishing a streamlined structure with a minimal commitment of resources. Also, a recent independent audit of the Board's administrative operation conducted by Gardiner, Kamya & Associates, a private accounting firm, in November 1995, confirmed that a reliable and workable system of management controls operates as an integral part of the Board's administrative systems.

Customer Service

In the Board's public health and safety reviews, contacts with the public are primarily through open hearings and access to the Board's public reading room. Since 1990, the Board has held 48 public hearings at sites across the nation and in Washington, D.C. The public reading room is open to the public every working day and the staff has received numerous complimentary letters from private citizens, public interest groups, corporations, and other government agencies.

To assist the public in requesting information, the Board published a Customer Service Standard in July 1995. This publication catalogs the various public information services offered by the Board. This document was mailed to all groups and individuals on the Board's mailing list and placed in a new customer service category in our World Wide Web Home Page.

IV. PLANNED FOCUS OF BOARD ACTIVITIES DURING 1996

Operational Formality - A Complex-Wide Issue

As described broadly in Recommendation 95-2 and in DNFSB/TECH-6, operational formality is a structured and systematic way of planning and performing work while ensuring that a sound authorization basis for the facility or activity is preserved. It encompasses the set of practices used to ensure safety in a facility, and in the operations conducted therein, extending to the systematic coverage implied by the term "safety culture."

Operational formality is not simply a group of unrelated functional areas, but an integrated approach to performing essential elements of operations such as: ensuring that facility activities, including any environmental discharges, are conducted within the authorization basis; formal communications during evolutions; independent safety reviews of significant procedure and plant changes; continuing review of operating experience and implementation of lessons learned; and preparing, reviewing, approving and using operating procedures. Though details may vary from facility to facility, the need for a structured approach, appropriately tailored, remains constant and will be a major focus of the Board in 1996.

* * *

During the coming months, extending through and beyond 1996, the Board anticipates that the ongoing transition of the mission of DOE's weapons complex will continue to evolve. At the same time the weapons stockpile programs demand continuing attention, the legacies of aging facilities, widespread contamination, and huge inventories of highly toxic and radioactive waste products and residues from half a century of nuclear weapons production must be dealt with. In the face of these challenges, and as DOE realigns itself to accommodate mandated downsizing, the role of competent, independent, external oversight will become even more demanding. Based on its experience during the past five years, the Board believes that its oversight function is an indispensable element of the overall national effort to cope with the myriad safety issues at defense nuclear facilities.

Within this broad context, the Board plans to continue much the same emphasis it established a year ago. The Board will continue to place a high priority focus on complex-wide safety issues, such as the need to:

- oversee the continuation of dismantlement and storage of weapons and weapons components - to help ensure protection of the health and safety of the public and the workers involved, and of the environment;

- evaluate proposed upgrades to facilities and processes vital to the stockpile stewardship and management programs - to ensure their design adequacy and their safe operation;

- closely monitor DOE's upgrading of its technical capabilities and expertise and those of its contractors - to verify the effectiveness of DOE's program for improving staff qualifications at the same time it seeks to meet demands placed on a dwindling staff;

- ensure that DOE expedites the processing, packaging and safe long-term storage of plutonium-bearing materials - to reduce the risk of unwarranted exposures to these hazards;

- review in detail authorization bases prepared by DOE for priority facilities and activities - to verify conformance with established principles, including recent guidance prepared by the Board and its staff;

- monitor the integration of safety management of both defense nuclear research and development activities and weapon assembly, disassembly, and testing operations - to ensure that both can be accomplished effectively and safely;

- continue its close attention to DOE's program for resolving safety issues associated with existing inventories of corroding spent fuel in storage pools at several facilities and with byproduct material from historical defense enrichment operations - to assist DOE gain control of these potential and actual sources of significant contamination and radiological exposure;

- encourage DOE to continue to improve its radiation protection program - to reduce the risk of unnecessary worker exposures, as well as to reduce potential public exposures;

- monitor closely DOE's planning for work in hazardous and radiological environments, criteria for release of materials after cleanup, and development and evaluation of radiological protection performance indicators applicable to unique cleanup situations - to ensure adherence to the principles of the "As Low As Reasonably Achievable" concept

- evaluate DOE's ongoing expedited revision of its program for development and promulgation of requirements, including orders, rules, standards, guides and contract provisions, as well as reviewing DOE's programs for verification of adherence to those requirements - to ensure that DOE appropriately integrates these processes; and

- insist that DOE adopt sound systems engineering practices in all its safety-related projects and programs - to foster DOE's overall management of its safety program.

Technical issues at DOE continue to evolve. The combination of well-recognized and longstanding threats to public health and safety, accompanied by potentially hazardous new activities, presents different and potentially serious challenges. These include, for example, the need to:

- operate facilities for short periods to remove and stabilize radioactive or hazardous materials held up in processing lines and vessels;

- establish improved storage conditions to minimize corrosion of spent nuclear fuel stored in basins that were not designed for long-term use;

- gain control of the existing inventories of chemical and radioactive wastes, which continue to grow and are bound to become even larger when decontamination and decommissioning get underway in earnest;

- surmount technical problems associated with existing high-level radioactive waste storage tanks;

- ensure the safe startup and operation of high-level radioactive waste processing facilities;

- ensure that dismantlement of more than 2,000 warheads each year is conducted safely;

- design, construct, and operate facilities to store nuclear materials from dismantled nuclear weapons;

- consolidate weapons stockpile stewardship and management functions at a reduced number of sites, including in upgraded facilities that were previously used predominantly for research and development.

- process and replenish tritium in nuclear weapons retained in service; and

- determine possible roles of existing research and development facilities for limited production missions, and institute the significant modifications to traditional laboratory operating practices that will be required to fulfill those roles.

The Board is concerned that these technical challenges, and others not yet identified, may be at least as large in number and just as severe as those encountered during production operations.

Appendix A

Priority Facilities and Activities

Facility	Status (Note 1)	Hazards (Note 2)	Key Regulatory/ Oversight Bodies
SAVANNAH RIVER SITE FACILITIES			
F-Canyon/FB-Line/FA-Line H-Canyon/HB-Line/HA-Line	Operational (EM)	HIGH Plutonium, Uranium, Transuranics, HLW	DNFSB
DWPF/ITP/ESP HLW Tanks	Operational (EM)	HIGH Fission Products	DNFSB
RBOF, L-Basin, K-Basin and P-Basin	Operational (EM)	MODERATE Plutonium, Uranium, Fission Products	DNFSB
Tritium Facilities	Operational (DP)	HIGH Tritium	DNFSB

HANFORD FACILITIES			
High Level Waste Tank Farms	Operational (EM)	HIGH Fission Products	DNFSB, State, EPA
K-Reactor Area Fuel Storage Basins	Operational (EM)	MODERATE Spent Nuclear, Fuel and Sludge	DNFSB, State, EPA
Plutonium Finishing Plant	Operational (EM)	MODERATE Plutonium	DNFSB, State, EPA
Waste Encapsulation and Storage Facility	Operational (EM)	MODERATE Cesium & Strontium	DNFSB, State, EPA

Priority Facilities and Activities (Continued)

Facility	Status (Note 1)	Hazards (Note 2)	Key Regulatory/ Oversight Bodies
ROCKY FLATS FACILITIES			
Solution processing and SNM Storage Building 771	Shutdown	MODERATE Plutonium solution, SNM, and waste	DNFSB,State and EPA
Solution processing and SNM consolidated storage Building 371	Shutdown	HIGH Plutonium solution, SNM, and waste	DNFSB,State and EPA
Residue Processing and SNM Storage Building 776, Building 779, Building 707	Shutdown	MODERATE Bldg 776 could be HIGH based on contamination. Plutonium residue SNM, and waste	DNFSB,State and EPA
Highly Enriched Uranyl Nitrate Processing Building 886	Shutdown	MODERATE Highly Enriched Uranium Solution SNM, and waste	DNFSB,State and EPA

INEL FACILITIES			
Advanced Test Reactor	Operational (NE)	HIGH Fission Products, Uranium-235	DNFSB
CPP-603 Underwater Fuel Storage	Operational (EM)	MODERATE Fission Products, Uranium, Plutonium	DNFSB

Priority Facilities and Activities (Continued)

Facility	Status (Note 1)	Hazards (Note 2)	Key Regulatory/ Oversight Bodies
REPRESENTATIVE PANTEX FACILITIES			
Nuclear Weapon Assembly/Disassembly cells	Operational (DP)	HIGH High Explosives, Plutonium, Uranium,Tritium	DNFSB
Nuclear Weapon Assembly/Disassembly Bays	Operational (DP)	HIGH High Explosives, Plutonium, Uranium, Tritium	DNFSB
Building 12-116, SNM Staging Facility (New nuclear facility)	New Facility - Startup in FY 97 (DP)	MODERATE (at present) Plutonium, Uranium, Tritium	DNFSB
Building 12-104A, Special Purpose Bays (New nuclear facility)	New Facility - Startup in FY95 (DP)	MODERATE Weapons hazards Radiation Generating Device (Linac)	DNFSB

REPRESENTATIVE LANL NUCLEAR FACILITIES			
TA-55, Plutonium Facility, LANL's main facility for R&D and processing of plutonium.	Operational. (DP)	HIGH. Plutonium. Chemical hazards. Nuclear criticality.	DNFSB (New Mexico Environmental Department (NMED)
TA-3, Chemistry and Metallurgy Research Building, an R&D	Operational. (DP)	HIGH. Plutonium, Uranium. Chemical hazards.	DNFSB (NMED)
TA-18, Los Alamos Critical Experiments Facility	Operational. (DP)	HIGH. Nuclear criticality.	DNFSB
TA-16, Weapons Engineering Tritium Facility	Operational. (DP)	MODERATE. Tritium	DNFSB
TA-15, Dual Axis Radiographic Hydrotest (DARHT) Facility	Partially constructed. (DP)	HIGH. Radiation generating device. Explosions. Depleted Uranium. Chemical Hazards.	DNFSB

Priority Facilities and Activities (Continued)

Facility	Status (Note 1)	Hazards (Note 2)	Key Regulatory/ Oversight Bodies
REPRESENTATIVE OAK RIDGE FACILITIES			
Y-12: Highly Enriched Uranium Processing.	Operational. (DP)	MODERATE, HEU Hazardous, toxic, and radioactive materials	DNFSB
Y-12: Component Assembly, Disassembly, and Evaluation	Operational. (DP)	MODERATE, HEU, Lithium Hazardous, toxic, and radioactive materials	DNFSB
Y-12 and ORNL: Material Storage	Operational. (DP)	MODERATE HEU, ^{233}U, Hazardous, toxic, and radioactive materials.	DNFSB
K-25 Highly Enriched Uranium Remediation and Depleted Uranium Tailings Storage	Transition (EM)	MODERATE. HEU, DU, HF	DNFSB
REPRESENTATIVE LIVERMORE FACILITY			
Building 332, Plutonium Facility	Operational (DP)	MODERATE Plutonium, Uranium	DNFSB
SANDIA NATIONAL LABORATORIES FACILITIES			
Technical Area V: - Annular Core Research Reactor (ACRR) - Sandia Pulse Reactor Facility	Operational (DP)	MODERATE Highly enriched uranium fueled reactors.	DNFSB
REPRESENTATIVE NTS FACILITIES			
Abel Site, Area 27 (to be replaced by the Device Assembly Facility, Area 6)	Operational (DP)	HIGH High Explosives Plutonium, Uranium, Tritium	DNFSB
Radioactive Waste Management sites in Area 5, Area 3 and the TRU Pad	Operational (DP)	MODERATE Plutonium, Uranium	DNFSB

NOTES:
1. DP = DOE Defense Programs; EM = Environmental Management.
2. These are not DOE rankings. Rankings are tentative, currently under Board review.

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

[Recommendation 95-1]

Improved Safety of Cylinders Containing Depleted Uranium

AGENCY: Defense Nuclear Facilities Safety Board

ACTION: Notice; recommendation.

SUMMARY: The Defense Nuclear Facilities Safety Board has made a recommendation to the Secretary of Energy pursuant to 42 U.S.C. 2286a concerning improved safety of cylinders containing depleted uranium. The Board requests public comments on this recommendation.

DATES: Comments, data, views, or arguments concerning this recommendation are due on or before June 14, 1995.

ADDRESSES: Send comments, data, views, or arguments concerning this recommendation to: Defense Nuclear Facilities Safety Board, 625 Indiana Avenue, NW., Suite 700, Washington, DC 20004.

FOR FURTHER INFORMATION CONTACT: Kenneth M. Pusateri or Carol C. Morgan at the address above or telephone (202) 208-6400.

John T. Conway,
Chairman.

The three large gaseous diffusion plants that were operated by the Department of Energy (DOE) and its predecessors produced enriched uranium, some for defense use and some for incorporation into nuclear fuel for civilian reactors in the United States and other countries. In the course of isotope separation, most of the uranium ended up as the part depleted in U-235, designated as "tails" or "tailings". Enriched uranium at all desired assays was simultaneously extracted from the plants, for all purposes, and so no amount of tails can be identified as related to enrichment solely for either defense or civilian purposes. Most of all uranium ever mined in the United States or imported into the United States remains in tails at the gaseous diffusion plants. These tails are stored onsite at the three plants in large steel containers, normally termed "cylinders", as the chemical compound UF_6.

Members of the staff of the Defense Nuclear Facilities Safety Board recently had an opportunity to visit the gaseous diffusion plants, to follow up on information that had been obtained on safety of storage of the tails. A short report documenting the results of their review is attached. It was found that DOE has approximately 50,000 cylinders in outdoor storage at the three diffusion plants, containing more than 500,000 metric tons of UF_6. Poor maintenance and storage conditions, combined with mechanical damage suffered during handling, have led to corrosion and subsequent breaching of several of these carbon steel cylinders.

Cylinders have surface coatings (paint) of varying quality and integrity, which in a large number of cases is severely degraded. Cylinders are kept outdoors, some stacked on pads and some directly on the ground. Some older cylinders have been in storage in excess of forty years. Although general external corrosion seems to increase with time, handling damage and localized corrosion attributable to electrolytic attack appear to be more important factors in deterioration.

The corrosion-resistant coatings have not been maintained, leaving the vast majority of cylinders vulnerable to localized corrosion. Visual inspections have shown abundant pitting and crevic corrosion of the cylinders, as well as galvanic attack near bronze valves and plugs. Since neither localized corrosion rates nor the extent of existing defects in the cylinders are well known or well understood, it is uncertain how many cylinders may be expected to fail in the near future. DOE and MMES (Martin-Marietta Energy Systems) are attempting to evaluate the extent of the erosion rates and their consequences; results are very preliminary, but they indicate that more than 1,000 cylinders have a potential to breach before the year 2020 of no remedial actions are taken, with the result that their components of more than 10,000 tons of uranium could become accessible to release to the environment.

In section 1016 of Public Law 102-486 (October 24, 1992), Congress directed the Department of Energy to provide within one year a uranium inventory study that would include among other matters recommendations for the future use and disposition of inventories of all Government-owned uranium or uranium equivalents, including depleted tailings. The Department has not yet complied with this requirement, presumably at least in part because the matters addressed by Congressional action are very comprehensive and require extensive decisions on future courses of action.

It is clear to the Board that directions developed in response to section 1016 of Public Law 102-486 will affect the long-term future of the vast inventory of depleted uranium tails. However, the very size of that inventory means that no matter what actions may be taken, they will require a long time to consumate, with deterioration of the cylinders continuing all the while.

To protect against the dispersal of large amounts of uranium to soil and ground water in years to come, an early start to remedial action should be planned and then instituted. The alternative could be a massive problem with extraordinary financial costs.

Therefore, the Board recommends that:

1. An early program be started to renew the protective coating of cylinders containing the tails from the historic production of enriched uranium.

2. The possibility of additional measures be explored, to protect these cylinders from the damaging effects of exposure to the elements, as well as any additional handling that may be called for.

3. A study be instituted to determine whether a more suitable chemical form should be selected for long-term storage of the depleted uranium.

The Board designated Mr. Steven Krahn as its principal staff member for discussions with those in DOE whom you may designate to act on this recommendation and matters that may arise concerning it.

John T. Conway,

Chairman.

[FR Doc. 95-11870 Filed 5-12-95; 8:45 am]

BILLING CODE 3670-01-M

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

[Recommendation 95–2]

Safety Management

AGENCY: Defense Nuclear Facilities Safety Board.

ACTION: Notice; recommendation.

SUMMARY: The Defense Nuclear Facilities Safety Board (Board) has made a recommendation to the Secretary of Energy pursuant to 42 U.S.C. 2286a(a)(5) concerning Safety Management. The Board requests public comments on this recommendation.

DATES: Comments, data, views or arguments concerning this recommendation are due on or before November 20, 1995.

ADDRESSES: Send comments, data, views or arguments concerning this recommendation to: Defense Nuclear Facilities Safety Board, 625 Indiana Avenue NW., Suite 700, Washington, DC 20004.

FOR FURTHER INFORMATION CONTACT:

Kenneth M. Pusateri or Carole J. Morgan, at the address above or telephone (202) 208–6400.

Dated: October 16, 1995.

John T. Conway,

Chairman.

[Recommendation 95–2]

Safety Management

Dated: October 11, 1995.

The Defense Nuclear Facilities Safety Board (Board) has issued and the Secretary of Energy has accepted three sets of recommendations (90–2, 92–5, and 94–5) concerning the use of standards by contractors at the Department of Energy's (DOE) defense nuclear facilities, and the level of conduct of operations to be maintained at these facilities. These recommendations intersect in many of their implications. The Board now wishes to combine and modify these recommendations into a form that (1) reflects what it has learned from DOE's response to the recommendations, (2) more sharply focuses continued activity on the objectives DOE and the Board seek to achieve, and (3) is more clearly consonant with the actions which DOE has under way to modify DOE's system of Orders.

On March 8, 1990, the Board forwarded to the Secretary of Energy Recommendation 90–2. Briefly paraphrased, it recommended that (1) DOE identify the particular standards that it considered should apply to certain designated defense nuclear facilities of DOE, (2) DOE provide its views of the adequacy of these standards, and (3) DOE establish the extent to which the standards were being applied to the facilities. The Secretary accepted this Recommendation on June 11, 1990, and provided the Board with an acceptable Implementation Plan on November 9, 1994.

The principal product of implementation was to be a set of facility-specific documents that set forth the applicable standards and requirements for a selected set of DOE's defense nuclear facilities. These were termed Standards/Requirements Implementation Documents (S/RIDs). The S/RID was to contain those requirements considered necessary and sufficient for ensuring safety in the particular application. These were to be principally extracted from DOE Orders, appropriate standards, NRC guides, and similar sources. The S/RID was envisioned as the basis upon which work controls would be developed and implemented.

This concept has been maturing in the course of its application to several DOE defense nuclear facilities. Subsequently, in connection with its internal plans to restructure its system of Orders, DOE has developed the concept of the "necessary and sufficient" set of requirements at a site or a facility or for an activity. As applied to safety requirements, we recognize the "necessary and sufficient" and S/RID concepts to be identical. In the following, the identity of the two will be implicitly understood, although we shall continue to use S/RID as the preferred term for the documented set of applicable standards and requirements in agreements between DOE and its defense contracts. This is the nomenclature found in implementation plans submitted by DOE to the Board. To avoid confusion, we suggest that DOE continue uniform use of the term S/RID in this connection.

DOE is to determine the extent to which standards are implemented through a process of Order Compliance Self-Assessment. This has generally been accomplished through review of detailed compliance with the DOE safety Orders of interest to the Board. The practice is to be followed until S/RIDs are in place, after which time, the issue becomes compliance with requirements in S/RIDS.

The Board has viewed the Order Compliance Self-Assessment Program of DOE as an initial activity in the formulation of the S/RIDs. As part of this compliance self-assessment, DOE required the contractors to justify in documented form the rationale for judging requirements to be non-applicable. This procedural requirement has been reported to have caused the expenditure of more effort than merited to achieve the end result the Board sought, which was the establishment of the particular subset of requirements upon which the safety management programs at a site would be structured. In the recommendations below, the Board seeks to streamline the process of arriving at an Authorization Basis and Authorization Agreements with respect to DOE's safety management of its sites, facilities, and activities. The review and acceptance by DOE of (1) the hazards assessment of the work contracted, (2) the standards/requirements identified as appropriate, and (3) safety management controls committed by the contractor for the work would in effect constitute, in the view of the Board, a DOE determination of adequacy relative to sufficiency of the requirements base.

In another action, on August 17, 1992, the Board forwarded its Recommendation 92–5, which called for establishing certain safety policies at defense nuclear facilities faced with missions that were changing in response to the shifting world situation. The principal features of Recommendation 92–5 can be paraphrased as follows: (1) that facilities to be used in the longer term in nuclear defense missions or in cleanup from previous nuclear defense activities should be operated according to a superior level of conduct of operations, (2) that certain safety practices be followed at nuclear defense facilities being restarted after a long period of idleness, and (3) that defense nuclear facilities designated for various other kinds of use (such as standby) should be subject to a graded approach of safety criteria and requirements to be developed. The Board requested that it be informed on a timely basis of changes in the intended use of DOE's defense nuclear facilities.

Implicit in the Recommendation was a broader view of conduct of operations than adherence to written procedures and related activities directly in support of operations. It encompassed the entire set of practices used to ensure safety in a facility, and in the operations conducted therein, extending to coverage implied by the term "safety culture."

On December 16, 1992, the Secretary of Energy accepted Recommendation 92–5, and forwarded to the Board an Implementation Plan which the Board accepted on January 8, 1993.

Circumstances affecting DOE's defense programs have continued to evolve since then, and the view of the future of the defense nuclear establishment is now different from that in late 1992. Many facilities then scheduled for restart or standby are now slated for deactivation and decommissioning. Though the future form of the establishment continues to be uncertain, the Board believes that the extent of the changes and other intervening events makes it necessary to bring major features of its Recommendation 92–5 up to date and in line with the updating of Recommendation 90–2.

Another important development has been the elaboration of the S/RID concept into a system view of a standards-based safety management system.[1] This has shed further light on such important matters as permissible variability of safety management at facilities of different kinds and different levels of risk, and the formal means whereby an Authorization Agreement related to environment, safety and health objectives is incorporated into contractual terms.

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[1] Fundamentals for Understanding Standards-Based Safety Management, Joseph J. DiNunno. DNFSB/TECH–5

Principles that should guide the structure and use of safety management, the framework for conduct of operations appropriate to different cases, the basis for grading of safety management and conduct of operations, and the application to the important defense nuclear laboratories of the Department of Energy, are outlined in another document in the DNFSB/TECH sequence.[2] The points laid out in DNFSB/TECH–6 are consistent with those in DNFSB/TECH–5. Although the concepts and processes discussed in these documents are couched in terms of radiological hazards, they are more general, and apply as well to hazards of other kinds. In addition, they offer an appropriate match to requirements established elsewhere for safety in decommissioning of facilities, and would serve as a bridge to such operations.

The Board agrees with the view adopted by DOE in certain pilot tests presently under way, that the contractor for a site, facility, or activity should originate the drafting of the Safety Management Plan and the S/RID with assistance and input as appropriate by DOE. DOE has the responsibility for determining that the proposed S/RID will ensure an adequate level of safety, and finally approving it when it is found to be satisfactory. In the Board's view, an S/RID should be the central component of the Authorization Agreement which should have contractual status as part of the agreement with the contractor relevant to performance of the work authorized for the site, facility, or activity.

In accordance with its statutory directive to review DOE's safety standards and their implementation, the Board plans to track selected S/RIDs and the associated Safety Management Programs as they are developed. The Board will formally review them after their completion and will provide its comments to DOE in letters to the Secretary or in the statutory form of recommendations. The Board would normally expect DOE to have performed its own review with documentation of the results before being formally provided with the Board's comments.

We recognize that the various DOE organizational units which may be delegated review and approval authority for S/RIDs and associated Safety Management Programs may not have enough individuals with qualifications in the technical specialties required to carry out effectively the streamlined process being recommended. This means that technical assistance may need to be retained from elsewhere to compensate for such personnel deficiencies where they exist. It also means that DOE may need to augment its own technical expertise so as not to be obliged to continue indefinitely to rely on technical assistance from outside DOE.

The Board renews its request that it be informed on a timely basis of changes in planned use of defense nuclear facilities. In addition, the Board now wishes to replace Recommendations 90–2 and 92–5. The schedule agreed to by DOE and the Board for S/RID development and implementation pursuant to Recommendation 90–2 will be revised and carried forward as a part of Recommendation 94–5, which is not being otherwise modified at this time.

Therefore, the Board recommends, that DOE:

1. Institutionalize the process of incorporating into the planning and execution of every major defense nuclear activity involving hazardous materials those controls necessary to ensure that environment, safety and health objectives are achieved.

2. Require the conduct of all operations and activities within the defense nuclear complex or the former defense nuclear complex that involve radioactive and other substantially hazardous materials to be subject to Safety Management Plans that are graded according to the risk associated with the activity. The Safety Management Plans and the operations should be structured on the lines discussed in the referenced documents DNFSB/TECH–5 and DNFSB/TECH–6.

3. Establish a new list of facilities and activities prioritized on lines of hazard and importance to defense and cleanup programs, to focus the transition from implementation programs related to 90–2 and 92–5 to this revised development of S/RIDs and associated Safety Management Plans, following the process of Section I of DNFSB/TECH–6.

4. Promulgate requirements and associated instructions (Orders/standards) which provide direction and guidance for this process including responsibilities for carrying it out. The manner of establishing responsibilities and authorities as currently set forth in DOE Order 5480.31 (425.1) for Operational Readiness Reviews should serve as a model for preparing, reviewing, and approving the Safety Management Programs. The requirement for conformance should be made a contract term.

5. Take such measures as are required to ensure that DOE itself has or acquires the technical expertise to effectively implement the streamlined process recommended.

John T. Conway,
Chairman.

October 11, 1995

The Honorable Hazel R. O'Leary,
Secretary of Energy, Washington, DC 20585

Dear Secretary O'Leary: On October 11, 1995, the Defense Nuclear Facilities Safety Board, in accordance with 42 U.S.C. § 2286a(a)(5), unanimously approved Recommendation 95–2 which is enclosed for your consideration. Recommendation 95–2 deals with Safety Management.

42 U.S.C. § 2286d(a) requires the Board, after receipt by you, to promptly make this recommendation available to the public in the Department of Energy's regional public reading rooms. The Board believes the recommendation contains no information which is classified or otherwise restricted. To the extent this recommendation does not include information restricted by DOE under the Atomic Energy Act of 1954, 42 U.S.C. §§ 2161–68, as amended, please arrange to have this recommendation promptly placed on file in your regional public reading rooms.

The Board will publish this recommendation in the Federal Register.

Sincerely,

John T. Conway,
Chairman.

Enclosure
c: Mark Whitaker, EH–9

[FR Doc. 95–25946 Filed 10–18–95; 8:45 am]

BILLING CODE 3670–01–M

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[2] Safety Management and Conduct of Operations at the Department of Energy's Defense Nuclear Facilities, DNFSB/TECH–6.

The Secretary of Energy
Washington, DC 20585

March 18, 1996

The Honorable Bob Livingston
Chairman
Committee on Appropriations
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

Section 316(b) of the Atomic Energy Act of 1954 as amended (42 U.S.C. § 2286e(b)) requires the Department of Energy to submit a written report to Congress concerning the Department's activities in response to Recommendations and other interactions with the Defense Nuclear Facilities Safety Board (Board). We are pleased to enclose the Department's Annual Report for calendar year 1995.

The Department has made significant progress on health and safety issues during 1995. The Department reduced the number of open Board Recommendations by 19 percent (from 21 to 17). Six Board Recommendations were closed as a result of Department activities while only two new Board Recommendations were received. The Department submitted six new Implementation Plans in 1995 in response to Board Recommendations the Department accepted in 1994 and 1995. The Department also established a number of broad-based initiatives to increase health and safety assurance. Key Department initiatives include the Strategic Alignment, Directives Reform, Contract Reform, the Department Standards Program, Integrated Safety Management of Research and Development Activities, and the Advisory Committee on External Regulation. In addition, the Department continues to make progress at improving the quality of communication and interaction between the Department and the Board.

If you have any questions, please contact me or have your staff contact Mr. Mark Whitaker, Departmental Representative to the Defense Nuclear Facilities Safety Board, at (202) 586-3887.

Sincerely,

Hazel R O'Leary

Hazel R. O'Leary

Enclosure

cc:
The Honorable David Obey
Ranking Minority Member

DOE/S-0115

ANNUAL REPORT TO CONGRESS

Department of Energy Activities Relating to the Defense Nuclear Facilities Safety Board

Calendar Year 1995

Washington, D.C. 20585

March 1996

The Secretary of Energy
Washington, DC 20585

March 18, 1996

The Honorable Al Gore, Jr.
President of the Senate
Washington, D.C. 20510

Dear Mr. President:

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Sincerely,

Hazel R O'Leary

Hazel R. O'Leary

Enclosure

I. INTRODUCTION

This is the sixth Annual Report to the Congress describing Department of Energy (Department) activities in response to Recommendations and other interactions with the Defense Nuclear Facilities Safety Board (Board). The Board, an independent executive-branch agency established in 1988, provides advice and recommendations to the Secretary of Energy regarding public health and safety issues at the Department's defense nuclear facilities. The Board also reviews and evaluates the content and implementation of health and safety standards, and other requirements, relating to the design, construction, operation, and decommissioning of the Department's defense nuclear facilities.

The Department has made significant progress on health and safety issues during 1995. The Department has established a number of broad-based initiatives to increase health and safety assurance. Key Department initiatives include the Strategic Alignment, Directives Reform, Contract Reform, the Department Standards Program, Integrated Safety Management of Research and Development Activities, and the Advisory Committee on External Regulation. The Department has also reduced the number of open Board Recommendations by 19 percent (from 21 to 17). Six Board Recommendations were closed as a result of Department activities while only two new Board Recommendations were received. In addition, the Department continues to make progress at improving the quality of communication and interaction between the Department and the Board.

Closed Recommendations

Table 1 provides a summary status on Board Recommendations. Department activities culminating in 1995 led to closure of the following six Board Recommendations:

- Recommendation 90-2, Codes and Standards
- Recommendation 90-4, Rocky Flats Operational Readiness Reviews
- Recommendation 90-5, Rocky Flats Systematic Evaluation Program
- Recommendation 90-6, Rocky Flats Plutonium in the Ventilation Ducts
- Recommendation 92-5, Discipline of Operations During Changes
- Recommendation 92-6, Operational Readiness Reviews.

New Recommendations and Implementation Plans

The Department accepted two new Recommendations received from the Board during 1995:

- Recommendation 95-2, Safety Management
- Recommendation 95-1, Improved Safety of Cylinders containing Depleted Uranium.

The Department also completed six new Implementation Plans in 1995 in response to Board Recommendations the Department accepted in 1994 and 1995. These Plans define the Department's approach and schedule to resolve the associated safety issues Table 2 provides key dates for active Board Recommendations.

Report Preview

The remaining portions of the annual report provide the contents described below:

- Section II, KEY DEPARTMENT INITIATIVES, describes broad-based Department activities that affect health, safety, and the environment.
- Section III, IMPLEMENTATION OF BOARD RECOMMENDATIONS, describes Department activities completed in 1995 to implement Board Recommendations accepted by the Secretary.
- Section IV, BOARD INTERFACE INITIATIVES, describes Department activities to maintain communications and improve interaction between the Department and the Board.
- Section V, CONCLUSIONS, provides a summary of the Department's accomplishments in 1995 and a preview of the Department's challenges for 1996.

Table 1
Summary Status of Board Recommendations

REC	SUBJECT	OPEN	CLOSED
90-1	Savannah River Operator Training		10/27/92
90-2	Codes and Standards		**10/24/95**
90-3	Hanford Waste Tanks		5/1/92
90-4	Rocky Flats Operational Readiness Reviews		**2/16/95**
90-5	Rocky Flats Systematic Evaluation Program		**10/24/95**
90-6	Rocky Flats Plutonium in the Ventilation Ducts		**10/24/95**
90-7	Hanford Waste Tanks	•	
91-1	Safety Standards Program		10/27/92
91-2	Reactor Operations Management Plan		10/27/92
91-3	Waste Isolation Pilot Plant		10/27/92
91-4	Rocky Flats Building 559 Operational Readiness Review		5/1/92
91-5	Savannah River K Reactor Power Limits		4/7/93
91-6	Radiation Protection	•	
92-1	Operational Readiness of the HB-Line at Savannah River		10/27/92
92-2	Facility Representatives	•	
92-3	HB-Line Operational Readiness Reviews		2/3/93
92-4	Multi-Function Waste Tank Facility at Hanford	•	
92-5	Discipline of Operations During Changes		**10/24/95**
92-6	Operational Readiness Reviews		**10/24/95**
92-7	Training and Qualification		11/4/93
93-1	Standards Utilization in Defense Nuclear Facilities	•	
93-2	The Need for Critical Experiments Capability	•	
93-3	Improving Technical Capability in Defense Nuclear Programs	•	
93-4	Environmental Restoration Management Contracts	•	
93-5	Hanford Waste Tanks Characterization Studies	•	
93-6	Maintaining Access to Nuclear Weapons Expertise	•	
94-1	Improved Schedule for Remediation	•	
94-2	Safety Standards for Low-Level Waste	•	
94-3	Rocky Flats Seismic and Systems Safety	•	
94-4	Deficiencies in Criticality Safety at Oak Ridge, Y-12	•	
94-5	Integration of Rules, Orders, and Other Requirements	•	
95-1	Improved Safety of Cylinders Containing Depleted Uranium	•	
95-2	Safety Management	•	

Table 2
Key Dates For Active Board Recommendations

REC	SUBJECT	REC DATE	RESPONSE DATE	IMPL PLAN DATE
90-7	Hanford Waste Tanks	10/12/90	12/3/90	12/2/94 (Rev 1)
91-6	Radiation Protection	12/19/91	1/31/92	6/17/92 (Rev. 2)
92-2	Facility Representatives	5/28/92	7/20/92	11/5/92 (Rev. 1)
92-4	Multi-Function Waste Tank Facility at Hanford	7/6/92	8/28/92	11/7/94 (Rev. 1)
93-1	Standards Utilization in Defense Nuclear Facilities	1/21/93	4/22/93	7/19/93
93-2	The Need for Critical Experiments Capability	3/23/93	5/12/93	8/10/93
93-3	Improving Technical Capability in Defense Nuclear Programs	6/1/93	6/23/93	11/4/93
93-4	Environmental Restoration Management Contracts	6/16/93	8/6/93	11/8/93
93-5	Hanford Waste Tanks Characterization Studies	7/19/93	8/31/93	3/25/94 *
93-6	Maintaining Access to Nuclear Weapons Expertise	12/10/93	2/2/94	7/5/94 *
94-1	Improved Schedule for Remediation	5/26/94	8/31/94	**2/28/95**
94-2	Safety Standards for Low-Level Waste	9/8/94	10/28/94	**3/31/95 ***
94-3	Rocky Flats Seismic and Systems Safety	9/26/94	11/18/94	**6/30/95**
94-4	Deficiencies in Criticality Safety at Oak Ridge, Y-12	9/27/94	11/18/94	**2/24/95**
94-5	Integration of Rules, Orders, and Other Requirements	12/29/94	**2/21/95**	**7/21/95**
95-1	Improved Safety of Cylinders Containing Depleted Uranium	**5/5/95**	**6/29/95**	**10/16/95**
95-2	Safety Management	**10/11/95**	**1/18/96**	*

* - Implementation Plans currently under revision/development.

II. KEY DEPARTMENT INITIATIVES

The responsibility for safe operations at Department nuclear facilities lies with the Department and its contractors. The Department must provide an effective system for managing safety and must clearly define associated roles, responsibilities, and accountabilities. Line managers must be given the responsibility and held accountable for implementing health and safety requirements. These requirements must be clearly defined and must be commensurate with the hazards and risks associated with the work. Workers and managers need to possess the technical competence to assess and deal with the hazards associated with the operations for which they are responsible. Their duties include: 1) planning work with the proper attention to hazards; 2) setting priorities on the basis of risk; 3) providing for safety priorities in budget requests; 4) establishing clear environment, safety, and health expectations in contracts; and 5) setting up management systems to identify and track hazards and demonstrate performance. The Department strives for continual improvement in meeting its core responsibilities for protecting its workers, the public, and the environment.

The Board has had a significant positive impact on the Department's nuclear safety assurance by providing Recommendations. These Recommendations have played an important role in improving the Department's nuclear safety programs and operations. For each Recommendation that the Department accepts, the Department prepares an Implementation Plan that integrates desired improvements into its key facility safety activities already in progress. The Department must also continually balance safety improvement priorities and costs to ensure it makes the best use of its available assets in this time of reduced resources.

Key Department initiatives affecting health and safety are discussed further below and include: Strategic Alignment, Directives Reform, Contract Reform, the Department Standards Program, Integrated Safety Management of Research and Development Activities, and the Advisory Committee on External Regulation.

A. Strategic Alignment

In May 1995, the Department announced its plan for Strategic Alignment and Downsizing, "Saving Dollars and Making Sense." The Strategic Alignment actions are reducing layers of management, eliminating organizational redundancies, and integrating historically-isolated activities. Many opportunities to eliminate, consolidate, and downsize redundant activities across the Department have been identified, resulting in substantial staff reductions and savings over the next five years. In addition to reducing costs, these actions also improve performance, such as operational performance and health and safety performance, by improving focus on value-added activities. These actions allow the Department to better serve its customers as the Department delivers on its primary missions: protecting national security and reducing nuclear danger, enhancing long-term energy security, advancing the frontiers of scientific understanding, protecting the environment, and developing technologies that contribute to the country's economic productivity.

A number of Strategic Alignment actions are being implemented to eliminate unnecessary and redundant regulations and red tape that impose excessive cost burdens on the Department's performance of its missions. These actions include: simplifying, reducing, and reissuing departmental directives; instituting a fundamentally new approach called the Necessary and Sufficient Process to the application of standards at Department of Energy facilities; simplifying and streamlining the Department's audits and appraisals of its laboratories; introducing a wholesale change in procurement practices for Department contractors; working with the labs to remove costs from their operations as a result of simplified Department oversight; and moving toward external regulation of the Department's laboratories and facilities. A number of these initiatives to streamline burdensome oversight were already in progress For example, many deregulatory actions in relation to the Department's governance of its laboratories and facilities were initiated in response to the Task Force on Alternative Futures for the Department of Energy National Laboratories (the Galvin Task Force). Several of these key Department initiatives are discussed further below.

B. Directives Reform

The directives system documents requirements and guidance for management and technical functions. At the beginning of 1995, fifty-one directives addressed environment, safety, and health requirements, standards, and processes to be followed by the Department and its contractors. These documents tended to be prescriptive and process-oriented (rather than performance-oriented) and many were redundant or not generally applicable to all Department facilities. In an effort to clarify and streamline safety requirements, and in concert with the President's National Performance Review, the Department revised and consolidated all of its nuclear safety directives during 1995, significantly reducing the number of safety directives. This required careful technical review to retain the essential health and safety requirements and performance objectives, while translating necessary implementation approaches and methods into accompanying guides, technical standards, and handbooks. By identifying and clarifying the essential safety requirements, the Department and its contractors can better focus attention and resources on safety performance.

In a related effort, the Department is converting its most important nuclear safety requirements for its contractors into regulations pursuant to notice and comment rulemaking under the Administrative Procedure Act. By the end of 1995, four of these rules have been finalized: Procedural Rules for Department of Energy Nuclear Activities (10CFR820), Occupational Radiation Protection (10CFR835), Quality Assurance (10CFR830.120), and Contractor Employee Protection Program (10CFR708). Eight others are in process and anticipated to be published in 1996: Safety Analysis Reports (10CFR830.110), Unreviewed Safety Questions (10CFR830.112), Conduct of Operations (10CFR830.310), Technical Safety Requirements (10CFR830.320), Training and Qualification (10CFR830.330), Maintenance Management (10CFR830.340), Operational Occurrence Reporting (10CFR830.350), and Radiation Protection for the Public and the Environment (10CFR834). The conversion of nuclear safety directives to rules provides a more stable and predictable platform for requirements, and allows for better enforcement.

C. Contract Reform

In June 1993, the Secretary formed a Contract Reform Team to evaluate the contracting practices of the Department and to identify specific actions for improving those practices. The Report of the Contract Reform Team, "Making Contracting Work Better and Cost Less," was issued for implementation in February 1994. Forty-seven specific actions, with responsibilities and schedules, were identified to reform the contracting process. Among these actions was replacement of the Department's standard Management and Operating Contract with a new Performance-Based Management Contract and strengthening of the Department's systems for selecting contractors and managing contracts.

A central goal of Contract Reform is improving environment, safety, and health performance of the Department's contractors at less cost. Contract reform objectives in this area are: 1) assuring that the Department hires only contractors that are fully qualified to accomplish their environment, safety, and health responsibilities; 2) clearly identifying the agreed-upon environment, safety, and health requirements and clearly defining the key operating principles and performance-based management systems that the contractor will use to meet these requirements; 3) requiring contractors to use Department management systems for measuring environment, safety, and health performance; and 4) adequately funding each contract for these priorities. Similar to directives reform, these actions will permit better focus on the essential performance requirements, rather than over-emphasis on methods and procedures. The environment, safety, and health requirements will be clearly defined and the contractors will have more latitude and incentive to meet these requirements.

Requests for proposals now need to consistently include selection criteria on environment, safety, and health qualifications. Contracts need to consistently include the following:

- provisions for compliance with environment, safety, and health laws and rules and other agreed-upon standards/requirements;
- provisions requiring implementation of comprehensive environment, safety, and health programs;
- provisions regarding approval and execution of these programs, including associated Environment, Safety and Health (ES&H) Management Plans;
- provisions requiring flowdown of environment, safety, and health requirements to subcontractors; and,
- stop work notices for non-conformance with laws or the ES&H Management Plan.

A contractor ES&H Management Plan must delineate the management systems/procedures and the set of activities the contractor commits to undertake to meet the Department's ES&H performance expectations.

The Department has continued to make significant progress during 1995 in implementing the Contract Reform initiatives. As various contracts come up for renewal or competition, revised bid specifications and selection processes are instituted. For example, when the Department selected a General Integrating Contractor for the Rocky Flats site and a Management Contractor for the Nevada Test Site, contract reform initiatives were implemented. Other major defense nuclear facilities sites experiencing contract reform during 1995 include Savannah River and Hanford.

D. Department Standards Program

The Department Standards Committee, chaired by the Assistant Secretary for Environment, Safety and Health and consisting of senior executives from major Headquarters and Field Elements, was established to integrate the Department's standards efforts and establish the criteria for a Department standards program. The Criteria for the Department's Standards Program (DOE/EH/416) were established in August 1994. Elements of the program are in various stages of development. The Department Standards Committee is the element that links and coordinates major standards-related initiatives. It does so by developing and maintaining a plan for the actions, schedules, and responsibilities necessary to tie the current standards activities together in a coherent fashion. A primary task of the Department Standards Committee is to achieve a common understanding that the Department's work must be planned, performed, and appropriately documented in accordance with agreed upon standards to ensure adequate protection of the safety and health of the worker, the public, and the environment.

The Department's Standards Program calls for Department line management and contractor management to implement necessary and sufficient sets of standards to provide protection during the accomplishment of work, including all requirements imposed by law. To meet this program criterion, the Department Standards Committee has developed a Department-wide process to identify and implement standards that are necessary and sufficient to adequately protect workers, the public, and the environment (Necessary and Sufficient Process). This process has built upon existing standards processes without adopting a "one-size-fits-all" approach and has been refined through lessons-learned from nine pilot demonstrations conducted during 1995. The Department Standards Committee completed development of the Necessary and Sufficient Process in December 1995 and has recommended approval for initial use. Departmental approval and subsequent initiation of the implementation of the Necessary and Sufficient Process are expected in early 1996.

The Necessary and Sufficient Process uses total quality management principles to empower teams of people at the lowest level who are familiar with the work and hazards. The starting point is a clear understanding of the work to be performed, such as construction, operation, manufacturing, research, transportation, or remediation. A team analyzes the work plan to determine potential hazards and identify ways to remove or control those hazards. This team includes individuals with detailed knowledge of the work to be done, subject matter experts, resource providers, and when appropriate, people affected by the work hazards. This process is intended to be both cost-effective and flexible, and to increase ownership of the standards identified and implemented.

E. Integrated Safety Management of Research and Development (R&D) Activities

Early in 1995, the Department and its three nuclear weapons laboratories held a series of meetings with the Board which focused on effective means of managing the safety of R&D in support of National Security missions. The Board, in a letter to the Department dated April 28, 1995, reported the results of these discussions and requested the Department prepare a report responding to the issues raised in their letter. In response, the Department, under the leadership of the Manager, Albuquerque Operations Office, chartered a "Working Group" of line management representatives from the Department and the nuclear weapons laboratories to develop the framework of an integrated safety management system tailored to the needs of the nuclear weapons laboratories. The Department provided a summary report, "Managing the Safety of Defense Nuclear Research and Development Activities," in September 1995, which describes how the Department will proceed in developing a set of essential elements for integrated safety management systems.

The Working Group continues to work together closely to develop a common understanding of how to accomplish integrated safety management for R&D activities. They have defined the fundamental premise of Integrated Environmental Protection, Safety and Health Management as the use of sound management principles that systematically integrate environment, safety and health into management and work practice at all levels so that missions are accomplished with an adequate level of protection to the public, the worker and the environment. The Working Group has developed thirteen guiding principles, including descriptions, that if implemented, systematically integrate environment, safety and health assurance into R&D management and work practices at all levels. These principles fall into the categories of management accountability, Department and laboratory relationships, competence commensurate with responsibility, and appropriate and comprehensive requirements. The Working Group is continuing its activities to further develop the framework for an integrated safety management system, including a needed glossary of key terms and definitions. Additionally, the nuclear weapons laboratories are continuing their efforts to translate the guiding principles fully into the work practices and management system at their respective laboratory.

This effort towards an integrated safety management system is closely related to other departmental initiatives and Board activities. Accordingly, the Working Group is closely coordinating its work with related activities within the Department, including the Department Standards Committee and the response to Board Recommendation 95-2 to share lessons and to support efforts to developing an integrated safety management system.

F. Advisory Committee on External Regulation

In January 1995, the Secretary of Energy charged the Advisory Committee on External Regulation to provide advice, information, and recommendations on two questions: whether and how new and existing Department facilities and operations might be externally regulated to ensure nuclear safety. The Committee was drawn from a cross section of public, Federal, State, Tribal, industrial, and academic sectors, deliberately chosen to represent a diverse range of public and occupational health and safety, facility safety, environmental, and regulatory backgrounds. The Committee held eight meetings in nine months, all of which were open to the public. Sixty members of stakeholder organizations and the public addressed the Committee and presented their views and objectives about Department safety and regulation.

The Committee's December 1995 report, "Improving the Regulation of Safety at DOE Nuclear Facilities," offered a number of relevant observations and recommendations to strengthen both the regulation and the assurance of safety at Department facilities. The Committee's three fundamental recommendations were:

- Essentially all aspects of safety at the Department's nuclear facilities and sites should be externally regulated.
- Existing agencies rather than a new one should be responsible for external regulation.
- Under any regulatory scheme, the Department must maintain a strong internal safety management system.

The Secretary strongly endorsed each of the three major recommendations and indicated that the Department will have a course of action for external regulation by March 20, 1996 and an implementation package by May 15, 1996. The Committee report confirms that a well designed and effective system of external regulation of all aspects of nuclear safety–facility safety, worker safety, and environmental protection–is necessary to ensure public credibility and to prevent potential future accidents, contamination and exposures. The Committee considered a number of criteria in reaching the conclusion for external regulation, including safety, credibility, stability, accountability, efficiency, focus, flexibility, and practicality. The report's recommendation for external regulation is based primarily on considerations other than cost benefit, namely that: 1) the Department should be externally regulated for the same reasons as industry and other Federal facilities and sites, 2) credibility is critical to success of both safety regulation and Department's missions, and 3) regulation of safety must both be effective and promote efficiency.

External regulation can provide the focus required to remove some of the greatest obstacles the Department now faces in trying to do its job as effectively as possible: the lack of stability in safety policy and management and the confusing, complex, and evolving internal and external regulation and oversight that now consume so much of the Department's resources without ensuring that safety itself is effectively and efficiently achieved. Freed of the burden of regulating itself, the Department would be able to concentrate on carrying out its missions more effectively. The Committee also recognized that the benefits of external regulation, "such as independent assessment and the credibility that flows from this, will entail additional costs to maintain the external regulators."

The Committee did not determine whether the Nuclear Regulatory Commission or Defense Nuclear Facilities Safety Board could more readily undergo the necessary changes to become the Department's external regulator for facility safety. Its report presented a clear description of the relative benefits of each of these two potential regulators. A Department task force, led by the Acting Under Secretary, is preparing a response to the Committee's report and developing a detailed plan to move the Department to external regulation. The task force is scheduled to complete the first phase of this response by March 20, 1996.

The Committee acknowledged that non-nuclear hazards at Department of Energy sites represent important and pervasive threats to workers. Any future regulatory regime must take these into account. The Committee underscored that a strong internal Department safety management system is essential under any external regulatory regime and noted with favor several Department of Energy efforts already underway to strengthen and streamline that internal system. The Committee recognized that there are a number of ongoing efforts to improve effectiveness of internal health and safety systems, including clarification of roles and responsibilities, directives reform, contract reform, use of a "necessary and sufficient" closure process to institutionalize the use of a graded approach to requirements determination, and internal oversight to hold line managers accountable for performance.

III. IMPLEMENTATION OF BOARD RECOMMENDATIONS

A. Recommendation Closures

Department activities culminating in 1995 led to Board closure of the following six Board Recommendations:

- Recommendation 90-2, Codes and Standards
- Recommendation 90-4, Rocky Flats Operational Readiness Reviews
- Recommendation 90-5, Rocky Flats Systematic Evaluation Program
- Recommendation 90-6, Rocky Flats Plutonium in the Ventilation Ducts
- Recommendation 92-5, Discipline of Operations During Changes
- Recommendation 92-6, Operational Readiness Reviews.

Recommendation 90-2, Codes and Standards

In March 1990, the Board issued Recommendation 90-2, which deals with the evaluation and implementation of standards relating to the design, construction, operation, and decommissioning of defense nuclear facilities. The Recommendation calls for the Department to identify current standards, determine their adequacy, and assess compliance with current standards. The Department's Implementation Plan was based on the development of Standards/Requirements Identification Documents at identified facilities. After requirements identification, each of these facilities was to perform an Order Compliance Self-Assessment to determine its level of implementation.

By 1995, the Department had developed associated direction and guidance to ensure consistent application of its approach and had completed requirements identification and order compliance assessment at many of the identified facilities. During this implementation, the Department concluded that real drawbacks existed in the application of this approach to some types of activities, such as research and development activities, environmental cleanup activities, and low-hazard facility operations. This realization ultimately led the Department Standards Committee to develop the Necessary and Sufficient Process. The Board addressed the Department's ongoing implementation and use of the Standards/Requirements Identification Document methodology in subsequent Board Recommendations. On October 24, 1995, the Board closed Recommendation 90-2, consolidating the schedule for development and implementation of Standards/Requirements Identification Documents with Recommendation 94-5, Integration of Rules, Orders, and Other Requirements, and with additional information being incorporated into Recommendation 95-2, Safety Management. In early 1996, the Board notified the Department that Recommendation 90-2 commitments would remain in effect until ultimate disposition of remaining actions are addressed in the Recommendation 95-2 Implementation Plan.

Recommendation 90-4, Rocky Flats Operational Readiness Reviews

Board Recommendation 90-4 identifies the need for an Operational Readiness Review at Rocky Flats. The Department's Implementation Plan calls for a review of procedures, plant modifications, operator training, and accident analyses prior to resumption of facility operations. This Implementation Plan successfully guided Department Operational Readiness Reviews for Rocky Flats Buildings 559 and 707. With the resumption of operations authorized for Building 559 in 1992 and Building 707 in 1994, all commitments were completed and closed. Experience gained in response to this Recommendation was applied in developing the new departmental Order 425.1, "Startup and Restart of Nuclear Facilities," as part of the Department's actions in response to Recommendation 92-6, Operational Readiness Reviews.

Recommendation 90-5, Rocky Flats Systematic Evaluation Program

This Recommendation calls for an upgrade of the Rocky Flats design and operations through the use of a Systematic Evaluation Program for improving defense in depth of design and positively influencing safety. Since 1990, the Department had established a Systematic Evaluation Program at Rocky Flats and had performed a number of evaluations on various facilities and functional areas. The scope of the Department's Implementation Plan diminished significantly with the changing mission of Rocky Flats from production to decontamination, decommissioning, environmental restoration, and economic development. The only remaining valid portions of the original Systematic Evaluation Program related to Building 371, which was the prime subject of subsequent Board Recommendation 94-3. The Department and the Board concluded in 1995 that this Recommendation had been overcome by events and should be closed.

Recommendation 90-6, Rocky Flats Plutonium in the Ventilation Ducts

This Recommendation addresses criticality safety at Rocky Flats, specifically within the ventilation ducts. The Department implemented a program of analysis, remediation, and monitoring to address these safety issues. "Prior to resumption" duct cleanup requirements had been completed at two buildings, Buildings 559 and 707. Sampling, analysis, and corrective actions had been performed at other buildings, including Buildings 371, 771, and 776.

While the Department's original Implementation Plan was conceived to prepare facilities to resume full operations, the mission of Rocky Flats was changed from production to decontamination, decommissioning, environmental restoration, and economic development. Due to these changes, the potential to increase plutonium holdup in ventilation ducting is no longer significant.

Rocky Flats has institutionalized a program for evaluating ventilation duct safety. Rocky Flats has extensive experience and expertise in performing these evaluations and defining corrective actions. Refined methods of measurement have been proven, and existing measurements do not indicate potential for criticality, even under accident conditions. In 1995, the Department and the Board concluded that the primary objectives of this Recommendation had been accomplished and it was closed.

Recommendation 92-5, Discipline of Operations During Changes

This Recommendation calls for the Department to focus on implementing disciplined operations in light of the changing missions of the Department's defense nuclear facilities. The Department's Implementation Plan committed to implement the Conduct of Operations Order throughout the complex in a graded manner. In 1994, fewer than 30 percent of the Department's facilities had fully implemented conduct of operations. In 1995, over 50 percent of the facilities achieved full implementation. Program and facility managers who authorize changes in facility status understand the associated Conduct of Operations expectations.

Conduct of Operations performance levels across the complex are monitored through occurrence reporting and performance indicators. Conduct of Operations remains a focus of other ongoing Department oversight and management programs, including the Department's Facility Representative program, the Environmental Management Operations Assessment program, the

Office of Environment, Safety and Health Independent Oversight programs, and facility startup and restart readiness reviews. Conduct of Operations is now part of the Department's safety culture. In 1995, the Department and the Board concluded that the primary objectives of this Recommendation have been accomplished. The Board addressed further improvements in Conduct of Operations in Recommendation 95-2, Safety Management, issued in October 1995.

Recommendation 92-6, Operational Readiness Reviews

This Recommendation calls for development of rules, procedures, orders, and directives to govern the safety aspects of Operational Readiness Reviews, the subject of several previous Board Recommendations. The Department's Implementation Plan identified steps to capture and institutionalize the good practices and lessons learned from previous Operational Readiness Reviews. By 1995, the Department had completed all Implementation Plan actions and recognizes its Operational Readiness Review capabilities as an important strength of the Department's safety program.

Department direction and guidance on Operational Readiness Reviews (Department Order 425.1 and Standard 3006-95) have been promulgated and have resulted in significant improvements in the preparation of facilities for startup and restart. The Department had also developed Test Readiness Assessment and Weapons Assembly/Disassembly Readiness Assessment procedures. The Department has successfully implemented its program at many facilities and continues to improve the rigor of its readiness review processes. In 1995, the Department and Board concluded that the primary objectives of this Recommendation had been accomplished and it was closed.

B. New Recommendations and Implementation Plans

The Department accepted two new Recommendations received from the Board during 1995:

- Recommendation 95-2, Safety Management
- Recommendation 95-1, Improved Safety of Cylinders containing Depleted Uranium.

The Department also submitted six new Implementation Plans in 1995 in response to Board Recommendations the Department accepted in 1994 and 1995. These plans define the Department's approach and schedule to resolve the associated safety issues. Table 2 provides key dates for active Board Recommendations.

Recommendation 95-2, Safety Management

Recommendation 95-2 combines and modifies previous Board Recommendations (90-2, 92-5, and 94-5) concerning use of standards and conduct of operations. The Recommendation calls for: 1) an institutionalized process for ensuring that environment, safety and health requirements are met, 2) graded safety management plans for conduct of operations, 3) a prioritized list of facilities based on hazards and importance, 4) direction and guidance for the safety management process, and 5) measures to ensure availability of technical expertise to effectively implement the streamlined process.

The Department's January 1996 response accepted most of the elements of the Recommendation, but specifically did not accept those elements of the Recommendation that prescribed specific methods that could be used to accomplish the accepted objectives. Over the past three years, the Department had developed and implemented a number of systems that are designed to achieve an acceptable level of safety throughout Department operations. Key among these policy initiatives and programs are directives reform, the Necessary and Sufficient Process, including the companion process relating to Standards/Requirements Identification Documents, and contract reform, including performance-based contracting. The Department's acceptance of this Recommendation reflects the recognition of the need to further institutionalize the process of incorporating environment, safety and health considerations into the planning and execution of activities.

The Department has formed an Implementation Plan Team, consisting of representatives of the various key Headquarters and Field Elements. This team is developing an integrated safety management process that incorporates ongoing safety management programs and initiatives, and provides adequate assurance, flexibility, and cost-effectiveness. The Department anticipates working closely with the Board to understand their issues and concerns and thereby develop a workable safety management process.

Recommendation 95-1, Improved Safety of Cylinders containing Depleted Uranium

Recommendation 95-1 identifies the Board's concerns about the storage conditions and ultimate disposal of depleted uranium hexafluoride in long-term storage at Portsmouth, Ohio; Paducah, Kentucky; and Oak Ridge, Tennessee. The Department is storing approximately 560,000 metric tons of depleted uranium hexafluoride in solid form in approximately 46,500 steel cylinders at the three gaseous diffusion plants. The Recommendation calls for 1) repainting or recoating the cylinders, 2) implementing protective measures to prevent future damage or corrosion, and 3) conducting a study on long-term storage of the depleted uranium.

The Department had initiated a program in 1992 to ensure the safety of the long-term storage of depleted uranium hexafluoride. The Department's response to the Board's Recommendation is to improve the cylinder maintenance program through a systems engineering approach to risk management. These improvements are being developed and instituted concurrently with program activities that are underway. The first step in this systems engineering approach to risk management is development of a Systems Requirements Document, which was completed in November 1995. Other significant accomplishments in 1995 include:

- All full, depleted uranium hexafluoride cylinders at the gaseous diffusion plant storage sites have been removed from ground contact, with none showing evidence of a breach. An improved storage yard design which provides an adequate inspection configuration is in use at the Paducah site and is approximately half full.
- Approximately 1,600 cylinders have been relocated and restacked into an adequate configuration for visual inspection at Paducah. A new storage yard is complete at Portsmouth, allowing reconfiguration to proceed.
- Painting of accessible, skirted cylinder ends has begun with approximately 1,750 painted at Portsmouth and 225 at Paducah since July 1995.
- Procedures have been revised to direct the safe handling of degraded cylinders, and personnel have been trained to these revisions.

- The Systems Engineering Management Plan, the second step in the disciplined systems engineering approach to risk management, is under development.

The Department's 95-1 Implementation Plan requires more than one year to implement due to the magnitude of the Department's actions and the deliberate, systems engineering approach being employed to establish and implement handling and storage solutions. The final deliverable of this Implementation Plan–approved safety analysis reports on the technical adequacy of depleted uranium hexafluoride storage–is scheduled for completion in March 1997.

Recommendation 94-5, Integration of Department of Energy Safety Rules, Orders, and Other Requirements

This Recommendation states the Board's belief that further Department actions were needed to ensure there is no relaxation of commitments made to achieve compliance with requirements of Orders while proposed rules are undergoing the development process. In particular, the Board expressed concern that activities underway to develop and comply with Standards/Requirements Identification Documents be continued. This Recommendation also calls for several actions related to safety management policy and process, the subject of subsequent Board Recommendation 95-2.

The Department's Implementation Plan, issued in July 1995, describes the development of the "Necessary and Sufficient Closure Process" for determining safety requirements for facilities and activities. Much of the focus on instituting the safety management process has shifted to Recommendation 95-2, received by the Department in October 1995. A key activity being worked under the 94-5 Implementation Plan is development of a revised, updated Functions, Assignments and Responsibilities Manual. Some of the key accomplishments related to this Recommendation during 1995 are:

- An Action Matrix outlining the action items approved by the Department Standards Committee to integrate and coordinate standards-related activities was issued in September 1995.

- Policy statements 410.1, "Developing Nuclear Safety Requirements," and 450.2, "Identification, Implementation and Compliance with Environment, Safety and Health Requirements," have been drafted and Board comments are being resolved.

- Departmental Order 251.1, "Directives System," was issued in October 1995 to explain the relationship between policy, requirements, guidance, technical standards, and implementation processes and expectations in a more complete and consistent manner.

- The Directives System Manual, DOE M 251.1, which fully describes the Directives System structure and the hierarchy of related documents which were identified as a Board concern, was issued in October 1995. The manual also describes the Order Exemption process.

Remaining actions from the 94-5 Implementation Plan include finalizing the associated Department Policy Statements, completing the Functions, Assignments and Responsibilities Manual, and determining an acceptable transition for Recommendation 90-2 items.

Recommendation 94-4, Deficiencies in Criticality Safety at Oak Ridge, Y-12

Recommendation 94-4 summarizes the Board's concern with criticality safety and conduct of operations at the Y-12 Facility at Oak Ridge. The Recommendation acknowledges that the Department and its contractor have taken steps to correct deficiencies and encourages more aggressive and comprehensive management actions.

The 94-4 Implementation Plan presented an aggressive schedule of near-term actions to support the Y-12 resumption effort. The Plan also presented a path of programmatic improvements to assure the achievement of an adequate level of safety at Y-12 over the long-term. The Implementation Plan includes assessments of the level of conduct of operations at Y-12, reviews of personnel training, and compliance evaluations on Operational Safety Requirements, Criticality Safety Analyses, and operating procedure controls. The Department is using contractor self-assessments, as well as Operational Readiness Reviews and Readiness Assessments, by Department managers and technical staff, and independent experts, to ensure that needed program improvements and culture changes are institutionalized.

The most significant accomplishment for 1995 was the resumption in September of operations with two of the five primary mission areas at the Y-12 facility: Receipt, Storage, and Shipping; and Depleted Uranium Operations. A third primary mission area, Quality Evaluation, is being carried out under special operating procedures. Resumption efforts continued on the remaining two mission areas: Disassembly and Assembly (scheduled for resumption by April 1996); and Enriched Uranium Operations.

Other significant accomplishments in 1995 include the following:

- Independent assessments of Criticality Safety Approvals/Operational Safety Requirements and Conduct of Operations were completed in the Fall of 1995. Final reports were delivered in December 1995. Corrective action plans were being developed at the end of 1995.
- Training Assistance Team assessments were completed for key departmental personnel at Y-12 and Headquarters in August and September 1995, respectively, and corrective action plans have been completed.
- Y-12 staff implemented numerous safety program and process improvements, including associated procedures and training, in the areas of conduct of operations, criticality safety, and operating safety requirements. The successful completion of the readiness assessments for the Receipt, Storage, and Shipping and Depleted Uranium Operation mission areas attests to the value added by these improvements.

The 94-4 Implementation Plan requires more than one year to implement due to the magnitude of the Department's actions involved and the related culture changes. Actions for Enriched Uranium Operations, the most complex of the five missions areas, involve upgrade of numerous requirements, criticality safety analyses, and operating procedures. Full resumption of the final mission area at Y-12–Enriched Uranium Operations–is expected to be completed by 1997.

Recommendation 94-3, Rocky Flats Seismic and Systems Safety

Recommendation 94-3 identifies the Board's concerns with the Systematic Evaluation Program being conducted at Rocky Flats. This program, which was initiated at the site in response to Recommendation 90-5, is a review of older facilities using current safety standards to assure safe operations. As the mission of Rocky Flats has changed, the 90-5 Implementation Plan had also been revised to address more directly the facility's changing role. Building 371 is now being considered for a unique role as the storehouse for the largest single accumulation of plutonium in the Department complex. There is a need to formulate an integrated plan to identify potential hazards from natural phenomena at Building 371 and to enhance protection of the building and its contents.

The 94-3 Implementation Plan employs a two phased approach to resolution of the issues in the Recommendation. Phase 1 has been detailed in the Implementation Plan. All aspects of the Recommendation are considered in Phase 1, although not all will be resolved during this phase. The objective in Phase 1 is to determine whether the structure, systems, and components for the proposed mission of Building 371 have sufficient seismic capability to justify going forward with more detailed evaluations and to ensure that any upgrades required to Building 371 are commensurate with the hazard posed by the facility's mission.

The principal accomplishment for 1995 is completion of analyses that resulted in the determination that Building 371, with some upgrades, has sufficient seismic capability for its proposed interim storage mission. An alternative solution for interim storage, the construction of a new passive storage vault, has emerged as a viable option. Both options are being evaluated and the Department expects to reach a final decision in 1996. An Integrated Program Plan reflecting this decision is being developed and is currently scheduled for completion by April 1996. Delivery of the Integrated Program Plan completes the Department's Implementation Plan commitments for this Recommendation.

Recommendation 94-2, Conformance with Safety Standards at Low-Level Nuclear Waste and Disposal Sites

Recommendation 94-2 expressed the Board's concern with the programs for the burial of low-level radioactive waste at defense nuclear facilities. The Recommendation calls for a comprehensive, complex-wide review of low-level waste management, similar to that conducted by the Department on spent fuel. The Board also emphasized the need to improve upon requirements for low-level waste storage, improve modeling of radionuclide migration, and evaluate current storage methods and compliance with relevant Department directives.

Significant accomplishments on the Department's Implementation Plan during 1995 include:

- In July 1995, the Department issued an interim policy statement to define the roles and responsibilities for low-level waste management and disposal. This policy addresses all low-level wastes, including mixed low-level wastes, and clarified existing Department directives on this subject

- The Department had developed the qualitative, risk-based methodologies and tools for conducting the Complex-Wide Review to identify low-level waste management and storage vulnerabilities. The review teams have been selected and field implementation is scheduled to begin in early 1996.

- In December 1995, the Department issued for review and comment throughout the complex a draft Systems Requirements Document, a comprehensive set of requirements for low-level waste management.

- The Department has completed a preliminary catalogue of ongoing Department research and development activities relevant to low-level waste management.

The current Implementation Plan is being revised to better address key technical issues involved in performing low-level waste performance assessments. These issues include: 1) use of the Comprehensive Environmental Response, Compensation, and Liability Act methodologies for pre-1988 wastes, and 2) guidance and criteria on analyzing source term interactions. The revised Implementation Plan is anticipated to be completed by April 1996

The Department's current Implementation Plan requires more than one year to implement due to the magnitude and complex-wide nature of the actions required. Department policy and precedents for low-level waste management, established through implementation of this plan, should have long-term impact. The Department anticipates that completion and approval of low-level waste assessments at all sites and locations throughout the complex may extend through the year 2000.

Recommendation 94-1, Improved Schedule for Remediation in the Defense Nuclear Facilities Complex

Recommendation 94-1 addresses the Department's need to improve the schedule for remediating situations involving the storage of nuclear materials within the defense nuclear facilities complex. The Recommendation calls for an accelerated schedule for stabilizing and repackaging specific liquids and solids containing fissile material and other radioactive substances in spent fuel storage pools, reactor basins, reprocessing lines, and various other buildings once used for processing and weapons manufacture. The Department is faced with increased requirements, competing needs, and additional challenges in remediation and storage of materials from disassembled nuclear weapons, materials that still remain in the production pipelines through which the process flow has been halted, and reclamation of former production sites, equipment, and stored products and wastes.

The Nuclear Materials Stabilization Task Group (NMSTG) was established on February 28, 1995 to integrate the Department's programs for stabilizing excess nuclear material to achieve safe, stable states for interim and long-term storage pending ultimate disposition. The NMSTG has established a program to integrate complex-wide actions that includes: 1) developing a corporate strategy to address stabilization issues; 2) evaluating and integrating facility stabilization capabilities; 3) procuring standardized equipment to support plutonium oxide stabilization and packaging for long-term storage; and 4) focusing research and development efforts on the technical challenges facing stabilization, storage, and disposition of plutonium and other nuclear materials.

The Department has made excellent progress in 1995 in implementing the Recommendation. Significant accomplishments for 1995 include the following:

- Completed 51 of 152 (over 33 percent) total plan milestones in 1995.
- Disposed of 22,700 liters of solutions containing plutonium and uranium from the Plutonium Uranium Extraction (PUREX) plant at Hanford by neutralization and transfer to the tank farms.
- Moved 259 units of fuel from CPP-603 at Idaho to improved storage conditions.

- Completed interim corrective measures to remove the potential for accidental criticality at the Molten Salt Reactor Experiment at Oak Ridge

- Repackaged 256 items at Rocky Flats where plutonium metal was in direct contact with plastic to remove potential for hydrogen gas generation.

- Vented 2,745 residue drums at Rocky Flats to mitigate hazards associated with hydrogen gas generation and drum pressurization.

- Restarted the F-Canyon and FB-Line facilities at Savannah River to support stabilization of plutonium solutions and other materials. Commenced stabilization of 320,000 liters of solution stored in F-Canyon.

- The NMSTG Research and Development (R&D) Plan, issued in November 1995, identifies technological needs, technology programs already in place, and the "gaps" that should be addressed by R&D initiatives. The Plutonium Focus Area, chartered in October 1995, is tasked with recommending solutions and monitoring progress in achieving solutions to the technical issues in the R&D Plan.

The 94-1 Implementation Plan requires more than one year to implement due to the extent and magnitude of the Department's actions involved at many sites and facilities across the complex. The schedule and milestones provided in the Department's Implementation Plan show completion of the planned activities in the year 2002.

C. Other Active Implementation Plans

Recommendation 93-6, Maintaining Access to Nuclear Weapons Expertise in the Defense Nuclear Facilities Complex

This Recommendation expresses the Board's concern that the unique talents and experience of personnel have been and are being lost from the Department and its weapons complex as a result of changes in the Department's mission and emphasis, and its subsequent downsizing. The Recommendation emphasized the need to retain access to and capture the unique knowledge of those individuals who have been engaged in weapons assembly, disassembly, and testing activities to avoid future safety problems in these areas. Retention of this information contributes to the Department's present and future capability to safely manage and maintain the weapons stockpile and disassemble existing weapons.

The Department's 93-6 Implementation Plan identified activities in nine task areas across six site locations. In 1995, the Department identified critical nuclear weapons skills, documented unique weapons knowledge, and developed programs to maintain the Department's access to personnel having these skills and knowledge. Specific accomplishments in 1995 include:

- The Department identified critical skills and knowledge for nuclear weapons assembly, disassembly, and testing.
- The Department reviewed the impact of the recent loss of Headquarters personnel; this resulted in the Defense Programs staffing plan
- The Department issued Notice N3131.1, "Access to Skills, Knowledge and Abilities of Retired Scientists and Engineers."
- The Department documented its nuclear test safety readiness capabilities.
- The Department evaluated the adequacy of administrative controls and engineered safeguards for providing assurance of nuclear explosive safety. The conclusion is that the effectiveness of qualified and experienced personnel using approved administrative controls would be enhanced with engineered safeguards.
- The Department's Albuquerque Operations Office and the Nevada Operations Office developed Recommendation 93-6 Archive Program Plans. These plans were approved by the Principal Deputy Assistant Secretary for Defense Programs, and the Operations Offices have been directed to proceed with implementation.

A revision to the Recommendation 93-6 Implementation Plan is under development with approval expected in early 1996. The Department's field offices and laboratories have participated extensively in revisiting the remaining open actions and schedules. Although the original Implementation Plan schedule was overly ambitious, the field offices and laboratories are confident they can support the new plan and schedule. As previously reported, this Implementation Plan has required more than one year to implement due to the multi-site nature of the planned actions. The planned Department actions are currently scheduled to be completed by the end of September 1996.

Recommendation 93-5, Hanford Waste Tanks Characterization Studies

This Recommendation encourages the Department to expedite and complete safety-related sampling analysis, with a priority placed on tanks on the watch list. The Board requested completion of characterization of the watch list tanks within two years. This Recommendation also calls for expansion of the laboratory productivity. Lastly, this Recommendation seeks integration of these characterization efforts with other systems engineering tasks.

The physical characteristics of the waste in the tanks, the distribution of the various types of waste material in the tanks, and the limited locations for sampling have hampered progress meeting commitments in the Recommendation 93-5 Implementation Plan. The Department fell short of meeting a major Recommendation 93-5 commitment to characterize all watch list tanks by October 1995. Problems early in 1995 with sampling equipment reliability and effectiveness contributed to the slow progress. Also, too much emphasis on collecting samples rather than integration of other sources of data (historical records, modeling data, etc.) with analysis of samples impeded an understanding of safety related phenomenology. Finally, a lack of qualified technical expertise contributed to slow progress resolving the aforementioned problems. These problems prompted the Department to begin revising the Recommendation 93-5 Implementation Plan late in 1995 and the revision is expected to be completed by April 1996. In addition, the Department commissioned a group of experts from private industry and academia, and led by the Pacific Northwest National Laboratory, to develop an *ab initio* characterization strategy, including recommendation for expediting characterization of the high-level waste tanks at Hanford. This evaluation is due by mid-1996.

During 1995, the Department enhanced the capability and efficiency of tank characterization for the Hanford waste tanks. Specific accomplishments in 1995 include:

- The technical expertise was improved through the use of outside technical resources, including the University of Washington, the Tank Characterization Advisory Panel, the Tank Sampling Advisory Panel, and workshops for senior scientists in relevant fields.
- Three Rotary Mode Core Sampling Systems were placed in service.
- Modifications were completed on the core sampling truck to improve its availability.
- Three new drilling crews were hired and all crews were trained and qualified in accordance with Department training directives.
- Analytical laboratory capacity was increased.

As a result, 93 tanks were sampled in 1995, a significant increase over the 24 tanks sampled in 1994.

The Recommendation 93-5 Implementation Plan is currently under revision to reflect lessons learned over the past two years of implementation. The estimated completion date of Implementation Plan activities is currently under evaluation as part of the revision effort As previously reported, completion of the Department's Implementation Plan has required more than one year due to the technical complexities of characterizing and analyzing the Hanford waste tanks. Due to the extensive sampling plans that remain, this Implementation Plan is expected to remain open beyond 1996.

Recommendation 93-4. Environmental Restoration Management Contracts

Recommendation 93-4 concerns health and safety factors associated with the Department's management and direction of environmental restoration management contracts. Recommendations also were included to review recent Uranyl Nitrate Hexahydrate accidents at Fernald, develop an operational readiness plan to resume Uranyl Nitrate Hexahydrate activities, and improve the Facility Representatives program at Fernald.

The Department's Implementation Plan formalizes and strengthens its technical management of environmental restoration management contracts through development of detailed project and technical management plans; allocation of qualified technical personnel to manage the contracts at both Headquarters and

Field levels; and application of lessons-learned from the Department's experience at Fernald to future contracting activities. Principal accomplishments for 1995 on this Implementation Plan were

- Fernald's restart procedure was developed based on Order 5480.31, "Startup and Restart of Nuclear Facilities," and the Operational Readiness Review Standard. Subsequent to the management and operating contractor's Operational Readiness Review, Headquarters conducted the Operational Readiness Evaluation during June 5-9, 1995, for the Uranyl Nitrate Hexahydrate Stabilization Project. Uranyl Nitrate Hexahydrate processing at Fernald was authorized for restart on June 15, 1995, and was completed on August 30, 1995.
- The Richland Technical Management Plan was updated in 1995, in concert with the Technical Management Plan developed by Fernald in 1994. A generic Technical Management Plan is updated annually by the Department and was updated in 1995.
- The Facility Representative Program was implemented at Fernald with initial qualification in October 1995

At the end of 1995, the Department has completed all of the Recommendation 93-4 Implementation Plan deliverables. As originally anticipated, this Implementation Plan has required more than one year to implement primarily due to operational challenges encountered during the restart of the Uranyl Nitrate Hexahydrate Stabilization Project at Fernald

Recommendation 93-3, Improving Technical Capability in Defense Nuclear Programs

Recommendation 93-3 addresses the technical capability of the Department's personnel who are associated with defense nuclear facilities. The Board's concerns included the Department's difficulty in attracting, developing, and retaining personnel who are adequately qualified by technical education and experience to provide the level and quality of management, direction, and guidance that are essential to the Department's safe operation of its defense nuclear facilities.

The Department is confronted by limitations and often reductions in the number of personnel authorized within the organization. This can be compounded by the difficulty in attracting and retaining highly competent personnel with the background, experience, and training appropriate for the Department's present and future requirements. Staffing for tomorrow's needs is not solely achieved by simply fine-tuning today's work force, but rather requires extensive, dedicated efforts in what can be extensive transition processes.

The Assistant Secretary for Defense Programs and the Assistant Secretary for Human Resources and Administration conducted a comprehensive, program-wide evaluation of staffing within Defense Programs. The evaluation produced a staffing profile for Defense Programs Headquarters, Operations Offices, and Area/Site Offices to address current and future staffing requirements.

The Department received legislative authority under the Defense Authorization Act of 1995 for Excepted Service Appointment Authority to recruit and retain qualified personnel to meet the Department's most pressing personnel needs. The Department hired twenty personnel during 1995 under the Excepted Service Appointment Authority, and an additional eighteen personnel were in the recruitment process at the end of 1995.

In accordance with the 93-3 Implementation Plan, the Department has standardized its approach to training and qualification of the Department's technical personnel. The Technical Qualification Program includes a General Technical Base Qualification Standard, twenty-three Department-wide Functional Area Qualification Standards, and additional Office/Facility-Specific Qualification Standards. The Department-wide Standards were completed during 1995. Implementation of the Program was achieved in 1995 such that each level of departmental management is familiar with the Program; the employees required to be part of the Technical Qualification Program have been specifically determined; and, those employees have been measured against the appropriate Technical Qualification Standards to determine where additional training is required. Approximately 2,500 technical personnel have been identified to participate in the Program.

Departmental Order 360.1, "Training," was approved in May 1995. Order 360.1 requires incumbents to complete required training within three years (i.e., by May 1998). This Order institutionalizes a Technical Qualification Program for technical personnel, including requirements for evaluating employees against Technical Qualification Standards and documenting the approval of exemptions and equivalencies to specified competencies. Additionally, Individual Development Plans are to be developed for each technical employee.

The nuclear safety rule 10CFR830.330, "Personnel Selection, Qualification, Training and Staffing Requirements at Department of Energy Reactor and Nonreactor Nuclear Facilities," has been prepared and is being reviewed for finalization in 1996. This rule defines requirements for contractor training and qualification at nuclear facilities. In accordance with its Implementation Plan, the Department is also implementing Training Implementation Matrices per departmental Order 5480.20A, "Personnel Selection, Qualification, and Training Requirements for Department of Energy Facilities."

As previously reported, completion of this Implementation Plan requires more than one year; the actions itemized in the Implementation Plan apply across all technical elements of the Department and involve significant programmatic and cultural changes. The completion of actions associated with the Technical Qualification Program for incumbents is currently projected by June 1998.

Recommendation 93-2, The Need for Critical Experiment Capability

Recommendation 93-2 recommended the Department retain its program of general purpose criticality experiments and direct the program toward the objectives of improving the information base underlying prediction of criticality and serving the educational needs of the community of criticality engineers. The Board emphasized the importance of maintaining a base of information in criticality control covering the physical situations that would be encountered in handling and storing fissile material in the future. This Recommendation also emphasized the need to maintain a community of individuals who are experienced and competent in practicing criticality control.

Established in December 1993, the Nuclear Criticality Experiments Steering Committee sets priorities and develops scope and funding requirements for criticality experiments, analytical codes, nuclear criticality data base development and maintenance, experimental bench marking of the codes and hands-on criticality training. The Committee process established by the Department in implementing this Recommendation has not only succeeded in addressing key issues relative to this important capability, but also has matured significantly. Initially, the Department focused on maintaining the capability to conduct critical experiments and hands-on training. During 1995, the

Department began viewing criticality predictive capability from a programmatic perspective. This view fully recognizes the contribution of each program element (experiments, training, benchmarking, analytical codes, and nuclear data) to the improvement of criticality predictability. It also recognizes that application of improved criticality predictability not only enhances criticality safety, but could potentially lead to significant cost savings in the handling and storage of nuclear materials. Some specific 1995 accomplishments are identified below:

- Eight experiments from the Committee's priority experiments list are currently in the planning phase, in process of being conducted, or having the results analyzed.

- Eight criticality training courses were conducted at Los Alamos.

- Priority enhancements to the Department's analytical codes and criticality benchmark data have been identified and are in progress.

Development of an equitable funding strategy that enhances the Department's capability to make continuous improvements in criticality predictability and training is the major issue that remains to be addressed. Funding for criticality experiments and training program elements has been stabilized at an appropriate level to maintain reasonable capability in those areas. Stabilization of funding at appropriate levels for the other three program elements must also be accomplished. Such institutionalization of a Nuclear Criticality Predictability Program within the Department with defined program elements and funding responsibilities is the final step before closure of Recommendation 93-2.

As previously reported, this Implementation Plan has required more than one year to implement due to the challenge of getting the program fully budgeted and institutionalized. The Department anticipates completion of the planned activities by September 1996.

Recommendation 93-1, Standards Utilization in Defense Nuclear Facilities

Recommendation 93-1 focuses on ensuring that the level of safety assurance at those facilities that assemble, disassemble and test nuclear explosives (weapons) is at least as rigorous as that required at other defense nuclear facilities. The Department's Implementation Plan calls for identification and modification of Department orders and directives that should be strengthened in relation to facilities that assemble, disassemble and test nuclear explosives. In accordance with the Recommendation 93-1 Implementation Plan, which also included a Board independent initiative, the Nuclear Explosive Safety Study Corrective Action Plan, the following departmental order revisions, implementation guide, and standards were prepared and delivered to the Board for review and comment in July 1995:

Order Revision 5610.10A, "Nuclear Explosive and Weapon Surety Program"

Order Revision 5610.11A, "Safety of Nuclear Explosive Operations"

G-5610.11, "Implementation Guide for Use with DOE Order 5610.11A Safety of Nuclear Explosive Operations"

DOE-STD-XXXX-95, "Preparation Guide for the U.S Department of Energy Hazard Analysis Reports for Nuclear Explosive Operations"

DOE-STD-YYYY-95, "Nuclear Explosive Safety Study Process"

DOE-STD-ZZZZ-95, "Personnel Assurance Program."

As previously reported, this Recommendation 93-1 Implementation Plan has required more than one year to implement due to the multi-site nature of the planned actions. The formal departmental concurrence process remains for the above order revisions, implementation guide, and standards. The Department anticipates resolution of all comments developed in the concurrence process and publication of the order revisions, the implementation guide and the standards by September 1996. The only other remaining open action item is related to order compliance at the Pantex Plant; this item is being reviewed for possible incorporation into another Implementation Plan.

Recommendation 92-4, Multi-Function Waste Tank Facility at Hanford

Recommendation 92-4 concerns the Hanford Multi-Function Waste Tank Facility design and other new defense nuclear facilities. The Multi-Function Waste Tank Facility, as an element of the Hanford Tank Waste Remediation

System Program, was intended to provide treatment and disposal of Hanford Site tank waste. The Board stressed the importance that the design engineering for the Facility incorporate systems engineering principles and approaches, detailed engineering criteria, and related practices that were essential to adequate protection of public health and safety. The Board recommended establishing an effective project management organization and adopting a systems engineering approach for the project to ensure its design meets the Department's safety goals.

The Department's Implementation Plan focuses on the use of an integrated systems approach in defining, controlling, and executing the overall Hanford mission. The Department has initiated a site-wide systems engineering approach to define and achieve the overall objectives of the Hanford site. The Department also has streamlined the Hanford management structure and process to improve its efficiency and provide a clear line of responsibility and accountability. In initiating the systems engineering effort, the approach selected was to define the technical baseline for the entire Hanford site through a site-wide, top-down systems analysis to identify, define, and integrate the site programs and projects. This analysis would identify site-level cleanup system deliverables which, when assigned to programs including the Tank Waste Remediation System, would define the boundaries, interfaces, and requirements for the site programs. Systems Engineering Management Plans and implementing procedures are being developed for site, program, and project requirements to provide the mechanism for monitoring and reporting performance against the requirements throughout the individual activity life cycles.

In 1995, the Department performed assessments that concluded that the Multi-Function Waste Tank Facility and the Aging Waste Transfer Line Projects should be cancelled. The associated Implementation Plan actions and deliverables are no longer necessary. With the deletion of these actions from the Implementation Plan, the remainder of the planned actions emphasize systems engineering.

As previously reported, this Implementation Plan requires more than one year to implement due to the magnitude of applying systems engineering principles throughout the Hanford activities. The estimated completion date of Implementation Plan activities is September 1997.

Recommendation 92-2, Facility Representatives

Recommendation 92-2 expresses the Board's concerns about the Department's selection, training, and assignment of its Facility Representatives. The Facility Representatives play a key role in establishing the Department's presence and setting high performance expectations for the management and operating contractor. They also play a key role by involving the Department's senior management at Headquarters and the Operations Offices in aggressively pursuing resolution of conduct of operations issues. The Facility Representatives spend the majority of their time observing operations and assessing operating conditions in their assigned facilities.

The Department's activities in completing the Action Plan continued through 1995. Significant accomplishments include:

- Complex-wide staffing of the Facility Representatives program increased in 1995. Approximately 93 percent of the Facility Representative positions were filled at the end of 1995. The selection and qualification processes for Facility Representatives emphasize conduct of operations knowledge and practical experience.

- Field organizations have developed site-specific qualification standards for Facility Representatives. Field organizations have evaluated incumbent Facility Representatives against the qualification standards, documented the results of the evaluations, and established training plans for the incumbent Facility Representatives.

- Facility Representative training program activities are implemented as continuing actions of the Technical Program Coordinating Committee. This Committee is coordinating training resources to support functional area qualification standards for Facility Representatives as part of the Department's program to improving technical capability.

The final deliverable of this Implementation Plan is a written report on the status of the program, its future plans, and methods to institutionalize periodic status reports by the Facility Representatives. A Task Force, led by the Office of Field Management, has been assembled and is currently assessing these matters. A final report of this assessment, anticipated to be complete by March 1996, should demonstrate successful completion of the Department's Implementation Plan for this Recommendation. As originally anticipated, the

Department's Implementation Plan has required more than one year to complete due to the complex-wide management issues involved, including program development and selection and training of the large number of Facility Representatives necessary.

Recommendation 91-6, Radiation Protection

The Recommendation concerns radiation protection policy and practices throughout the Department's defense nuclear facilities complex. The programmatic aspects identified in the Department's 91-6 Implementation Plan have been successfully completed. The Department has achieved, and the Board has acknowledged, significant improvement in radiological protection quality throughout the defense nuclear complex. However, specific radiological issues remain within the complex.

Since December 1991, the Department has undertaken a number of new measures to improve occupational radiation protection as highlighted below.

- The Department issued a radiological control policy in June 1993. The Department published, and to a large extent has implemented, measures to improve radiological performance as delineated in the Department's Radiological Control Manual. This Manual formed the basis for site-specific radiological control manuals at the Department's sites.

- The Occurrence Reporting and Processing System was developed to provide important data related to radiological protection and has been improved. Successful ongoing programs use data from this system for trending and promulgating "lessons learned." The Department's Occurrence Reporting and Processing System Task Force, consisting of Headquarters, Operations, and contractor personnel, issued its final report in August 1995.

- The Department has developed and implemented standardized core training for radiological workers and radiological control technicians. This is supplemented by additional job-specific and site-specific training. Full implementation of Standardized Core Training Courses was completed in December 1995, with a few exceptions. Defense nuclear facilities have implemented, or have committed to implement in the near future, a Post Training Evaluation and Retention Testing Program.

- The Department's Infrastructure Evaluation Team has conducted an independent, external evaluation of Headquarters, Operations, and contractor radiation protection infrastructure and resources at defense nuclear facilities. The Department's Management Action Plan in response to the Infrastructure Evaluation Team's report is under final development and has been briefed to the Board

- The Department has updated and codified its basic radiation protection standards in 10CFR835, "Occupational Radiation Protection." The provisions in this rule incorporate recent recommendations from authoritative scientific bodies and are consistent with the standards promulgated by other Federal agencies and current industry practices.

- The Department has approved its contractors' documented radiation protection programs that establish the plans and measures to ensure compliance with 10CFR835 by January 1996. The Department has also established an oversight structure for providing independent monitoring of compliance with 10CFR835.

10CFR835 establishes adequate basic protection standards and includes as-low-as-reasonably-achievable provisions. It encompasses the principles established in the Radiological Control Manual. This regulatory approach, with penalties for violations, ensures adequate worker radiological protection and is compatible with the Department's evolving necessary and sufficient requirements identification process. As a result, the Radiological Control Manual is being redesignated as a nonmandatory, guidance document.

As previously reported, this Implementation Plan has required more than one year to implement due to the cross-functional, multi-site nature of the planned activities, including achieving meaningful culture changes. Based upon changes and improvements in the Department's radiation protection program over the last several years, the Department has been reviewing the commitments made in the 91-6 Implementation Plan and is reaching the conclusion that many of these commitments should be considered complete, while others more appropriately could be consolidated into other open Board Recommendations or tracked through other avenues. The Department anticipates completion or disposition of all planned activities and deliverables by June 1996.

Recommendation 90-7, Hanford Waste Tanks

The Recommendation concerns ferrocyanide in the single-shell tanks used to store high-level waste at Hanford. The Recommendation calls for installing temperature sensors to monitor tanks containing ferrocyanide, performing gas cover sampling and analyses, accelerating the characterization program, and developing emergency plans for tank degradation or failure. As previously reported, completion of the Department's Implementation Plan has required more than one year due to the technical complexities of characterizing and analyzing the Hanford waste tanks.

The Department has completed the activities to resolve the safety issues identified in Recommendation 90-7 as follows:

- Enhanced temperature measurement - Installation of thermocouple trees in the ferrocyanide bearing tanks was completed in 1995.

- Continuous temperature monitoring - The thermocouple trees in the ferrocyanide bearing tanks have been connected to a centrally monitored and automatically recorded data management system for continuous monitoring.

- Cover gas monitoring - Headspace sampling of the ferrocyanide bearing tanks was completed in 1995. The sampling results confirmed earlier modeling studies that had concluded the flammable gas concentrations from ferrocyanide reactions in the tanks are too low to be of concern and that continued monitoring is not necessary.

- Ferrocyanide waste characterization - Modeling and simulation studies have shown that the high alkalinity and high radiation environment of the ferrocyanide bearing tanks lead to decomposition of the ferrocyanide compound. This has been confirmed through analyses of core and auger samples from ten of the eighteen ferrocyanide bearing tanks. The ten tanks sampled include tanks in which bounding conditions of relatively low alkalinity and low levels of radiation would be expected to result in relatively low decomposition rates for the ferrocyanide. Additional samples are not required to resolve the safety issue.

- Chemical reaction studies - Final reports of the studies were issued in September 1995 comparing chemical and physical parameters of ferrocyanide waste simulants with actual tank waste samples and integrating the Ferrocyanide Safety Program hydrolysis and radiolysis aging studies.

- Emergency response planning - Actions with respect to emergency response planning were completed prior to 1995. The emergency response system is exercised periodically to maintain and test the response capability

The aging experiments and tank samples demonstrate that the effect of waste aging has degraded the ferrocyanide contained in the tanks and support the conclusion that the tanks no longer pose an explosive safety hazard. To validate the worst case aging conditions determined from the studies, four ferrocyanide tanks have been sampled to obtain confirmatory samples. These samples are being analyzed as part of the ongoing characterization activities in accordance with the Department's Implementation Plan for related Recommendation 93-5, Hanford Waste Tanks Characterization Studies. Based on the above actions and studies and the fact that the Department has sampled and analyzed ten of the eighteen ferrocyanide tanks, the Department considers that the original safety issues have been addressed and the necessary Department actions of this Implementation Plan are complete. The Department expects to recommend closure of this Recommendation in early 1996.

D. Report on Implementation Plans Requiring More Than One Year

42 U.S.C. § 2286d(f)(1) states that, if complete implementation of a Department Implementation Plan takes more than one year, the Secretary must report this to Congress and set forth the reasons for the duration and when implementation is expected to be completed. In accordance, the following active Implementation Plans are expected to require a total of more than one year to complete.

90-7, Hanford Waste Tanks*
91-6, Radiation Protection*
92-2, Facility Representatives*
92-4, Multi-Function Waste Tank Facility at Hanford*
93-1, Standards Utilization in Defense Nuclear Facilities*
93-2, The Need for Critical Experiments Capability*

93-3, Improving Technical Capability in Defense Nuclear Programs*
93-4, Environmental Restoration Management Contracts*
93-5, Hanford Waste Tanks Characterization Studies*
93-6, Maintaining Access to Nuclear Weapons Expertise*
94-1, Improved Schedule for Remediation
94-2, Safety Standards for Low-Level Waste
94-4, Deficiencies in Criticality Safety at Oak Ridge, Y-12
95-1, Improved Safety of Cylinders Containing Depleted Uranium

* - Previously reported to require more than one year to implement.

The associated reasons and expected completion schedules were provided with the previous discussion of Department activities for each Recommendation

IV. BOARD INTERFACE INITIATIVES

The Department shares with the Board the common goal of ensuring adequate protection at its defense nuclear facilities of public and worker health and safety and the environment. To accomplish this goal, the Department's policy is to:

- Fully cooperate with the Board.
- Thoroughly consider the Recommendations and other safety information provided by the Board.
- Consistently meet its commitments to the Board.
- Conduct its interactions with the Board in accordance with the highest professional standards.

The Secretary has delegated to the Under Secretary of Energy the responsibility for ensuring that Board issues are properly addressed within the Department. The Office of the Departmental Representative to the Defense Nuclear Facilities Safety Board, reporting to the Under Secretary, manages the Department's overall interface with the Board and provides advice and direction for resolving identified safety issues

Meetings, Site Visits, and other Defense Nuclear Facilities Safety Board Interactions

The Department has continued to interact extensively with the Board and its staff, and feels it has become more effective and thorough in these interfaces. Department personnel supported over 200 formal meetings and site visits by the Board or its staff in 1995. This has included provision of logistical and technical support and interface, as appropriate, to facilitate unrestricted access by the Board and staff to the Department's facilities. Appendix A provides a summary of site visits supported by the Department during 1995.

In 1995, the Department and the Board exchanged over 180 items of correspondence. A large portion of the communications between the Board and the Department involves the Board's Recommendations and the deliverables for the Department's Implementation Plans. In addition, the Department receives and responds to trip reports detailing visits by the Board or its staff to the Department's facilities, and specific requests from the Board or staff for particular information or action by the Department. Appendix B provides a summary of key correspondence for 1995.

Secretary of Energy Quarterly Discussions with the Board

The Secretary initiated quarterly discussions in 1994 between the Board members and senior Department management. These discussions continued in each quarter of 1995 The Department typically is represented in these quarterly discussions by the Secretary, Under Secretary, Assistant Secretaries, and the Departmental Representative This forum facilitates senior level discussions of key safety and management issues and agreement on relative priorities and directions

Principal Deputy Assistant Secretary Meetings

Individual Board-related matters or topics typically may affect more than one of the Department's sites, programs, or offices. The Principal Deputy Assistant Secretaries are designated as the central point of contact for all Board-related matters within Defense Programs, Environmental Management, and Environment, Safety and Health with further coordination provided by the Office of the Departmental Representative. Scheduled meetings involve the appropriate Deputy Assistant Secretaries, the Office of the Departmental Representative, and other Department personnel, as appropriate. These meetings are focused to achieve a consistent understanding and response to individual topics, priorities, schedules, and to address and respond to potential problems that may arise within each Principal Deputy Assistant Secretary's area of responsibility.

These meetings are designed to provide an avenue for flow of information up and down the Department's organization in response to Board-related matters. They provide an additional link between the Secretary's quarterly discussions with the Board and the remainder of the Department.

Department Commitment Consolidation Initiative

This year the Department has evaluated existing Department commitments to identify those with common goals, activities, or resources and to consolidate them. This process involves consolidation of similar or overlapping commitments, identification of commitments that may have been overtaken by subsequent events, identification of commitments that do not measurably contribute to safety, and preparation of the basis for near-term closures. Closure of Recommendations and consolidation of remaining commitments enable both the Department and the Board to focus on safety improvements and thus utilize resources more effectively.

The Department has interfaced very successfully with the Board and its staff on this initiative. This initiative has been jointly promoted by both the Department and the Board. As a result of this initiative, the Department and the Board agreed to close five Board Recommendations in October 1995. Further, significant review and evaluation was accomplished on the Department's Recommendation 91-6 Implementation Plan on Radiation Protection. The Task Group has continued to work with the Board's Staff through December 1995 to negotiate closure of additional Recommendations. For example, Recommendations 92-2, Facility Representatives, and 93-4, Environmental Restoration Management Contracts, are potential candidates for closure in early 1996.

Guidelines for the Department's Interface with the Board

Guidelines for the Department's interface with the Board were promulgated by the Under Secretary in June 1994 to provide consistent, effective, and predictable interactions with the Board. The guidelines provide direction across site and organizational boundaries of the Department.

Revision 2 to the guidelines was issued in 1995. This revision incorporated additional lessons learned into the guidelines to improve the timeliness, responsiveness, and effectiveness of the Department's interface with the Board. Key revisions included a Format and Content Guide for Implementation Plans, improved process description and flow charts for the Recommendation Response and Implementation Plan Development processes, and integration of the Safety Issues Management System into the Guidelines.

Department Interface Workshop

The Office of the Departmental Representative to the Defense Nuclear Facilities Safety Board hosted an Interface Workshop in September 1995. The workshop was attended by approximately 100 Department and management and operating contractor personnel. Objectives for the workshop included an exchange of information and sharing of experiences among the participants in effectively interfacing with the Board.

Sixteen Operations Offices, Field Offices, Area Offices, and laboratories were represented in the workshop. Each of the Department's major Headquarters Offices involved in Board activities were also represented

Periodic Headquarters/Field Video Conference

Periodic joint video conferences are scheduled by the Office of the Departmental Representative to include Headquarters and Field representatives such as the Operations Offices, Site Offices and Area Offices. These video conferences provide a forum for the participants to remain current on Department safety initiatives and Board-related safety issues. Video conference topics typically are solicited in advance from the participants to provide the opportunity for specific issues of significance to them to be brought before the other participants

Safety Issues Management System

The Office of the Departmental Representative reviews the Department's Implementation Plans and other outgoing correspondence to the Board. Commitment information is identified from these documents and entered into the Safety Issues Management System database. Distribution of monthly reports on the status of commitment implementation or completion includes responsible Department managers, points of contact, and Secretarial Officers.

Monthly report information is sorted by Recommendation, site, organization, and overdue and near-term status. In addition, remote users have the on-line capability to view and sort the database of Board Recommendations, Department responses, and Implementation Plan commitments and actions.

Information Database of Defense Nuclear Facilities Safety Board-Related Documents

The Office of the Departmental Representative has prepared and maintains an information database of documents to support the Department's interaction with the Board. Documents relevant to the Board's activities are maintained in the database. The Office of the Departmental Representative maintains and controls the official information database, including any additions or deletions. An updated information database is distributed quarterly on diskette.

The database may be searched for words or phrases specified by the user's query The user may copy and print source documents from the database. Sections of a document may be highlighted within the user's database, and personal notes may be documented within the margin of the user's database, as desired. Other than highlighting sections, or attaching personal notes, the user cannot edit the index or the content of the database.

V. CONCLUSIONS

The Department has made significant progress on health and safety issues during 1995 In 1995, the Department reduced the number of open Board Recommendations from 21 to 17. Six Board Recommendations were closed as a result of Department activities while only two new Board Recommendations were received. For example, the Department's Operational Readiness Review program, the subject of a Board Recommendation closed in 1995, is now considered an important strength of the Department's safety program. The Department submitted six new Implementation Plans in 1995 in response to Board Recommendations the Department accepted in 1994 and 1995. The Department also established a number of broad-based initiatives to increase health and safety assurance. Key Department initiatives include the Strategic Alignment, Directives Reform, Contract Reform, the Department Standards Program, Integrated Safety Management of Research and Development Activities, and the Advisory Committee on External Regulation

In 1996, the Department intends to keep focus on assuring existing Implementation Plans remain valid and workable, managing Implementation Plan actions to completion by the identified Plan due dates, and pushing for closure of Implementation Plans when the underlying safety issues are resolved. A significant challenge for the Department in 1996 is to prepare a workable Implementation Plan in response to Board Recommendation 95-2, Safety Management. The Department's acceptance of key elements of this Recommendation reflects the recognition of the need to further institutionalize the process of incorporating environment, safety and health considerations into the planning and execution of activities. The Department's Implementation Plan team is focused on developing an integrated safety management process that incorporates ongoing safety management programs and initiatives, and provides adequate assurance, flexibility, and cost-effectiveness. The Department anticipates working closely with the Board to understand their issues and concerns and thereby to develop a workable safety management process.

Appendix A
Site Visits Supported by the Department in 1995

Fernald

- Review CRU-4 vitrification, February 16-17, 1995.
- CRU-4 Vitrification, Low Level Waste and Thorium Overpack, May 17-18, 1995.
- Uranyl Nitrate Hexahydrate Stabilization Project, Operational Readiness Review, June 5-9, 1995.

Hanford

- Systems engineering, criticality design, tank waste Remediation system, and the implementation of Recommendation 92-4, February 6-9, 1995.
- TeleVideo conference, Hanford environmental restoration program issues, February 21, 1995.
- K Basins, configuration management and Instrument & Controls systems, February 28-March 2, 1995.
- Recommendation 93-5 Technical Basis and Pretreatment review, March 13-16, 1995.
- Procedures review for Recommendation 92-4, March 20-23, 1995.
- Decontamination and Safety Review of Site Surplus Facilities; Deactivation and Decommissioning, April 24-28, 1995.
- Facility Status, Safety Basis and Systems; Operations and Training, May 15-18, 1995.
- Tank Farm Training and Qualification, Tank Waste Remediation System Requirements Review, Site-Wide Systems Engineering, and Implementation Plan 92-4, May 22-24, 1995.

- Recommendation 93-3, K-Basin and Miscellaneous Underground Storage Tanks, June 5-7, 1995.
- Board visit, June 6-7, 1995.
- Expected Life Analysis of SY101 Mixer Pump, June 13-15, 1995
- Emergency Exercise "Oz," June 19-23, 1995.
- Recommendation 92-4, Existing Cross Site Transfer Line Operational Readiness, and C-106 Retrieval Project Critical Design Reviews, June 27-29, 1995.
- Review of Tank Waste Characterization (Implementation of Recommendation 93-5) and Tank Farms Corrosion Programs, July 17-20, 1995.
- Spent Nuclear Fuel (K-Basins), July 24-27, 1995.
- DOE-RL Technical Management Plan & Implementation of Recommendation 93-4, August 1-3, 1995.
- K-Basin, Aug 21-23, 1995.
- Board and members of the Board staff traveled to Hanford to discuss Recommendation 93-5 (Tanks Characterization Studies); technical procedure adequacy; training, qualifications, and conduct of operations at B Plant; Standards/Requirements Identification Documents; Facility Representatives program; and K-Basin fuel storage, August 21-24, 1995.
- Plutonium Finishing Plant Vertical Calciner, September 18-20, 1995.
- Reactor Facilities Decommissioning, October 3-5, 1995.
- Design Basis of Canister Storage Building., October 18-19, 1995.
- Radiation Protection October 30-November 2, 1995.
- Tank Farm Safety and As Low As Reasonably Achievable Program, November 6-8, 1995.

- Board and members of the Board staff traveled to Hanford to review K-Basin/ Canister Storage Building, DOE-RL Facility Representative at K-Basin, Deactivation/Decommissioning (B-Plant, PUREX), Recommendation 93-5 Implementation status, Tank Farm Criticality Control, Procedure Improvement and progress, Recommendation 93-4 (Technical Management Plan), November 7-8, 1995.

- Tank C-106 Safety Review, November 13-16, 1995.

- Tank Farm Authorization Basis, Characterization and Pretreatment, December 5-6, 1995

Idaho National Engineering Laboratory

- Review the Pit 9 Remediation Project, environmental restoration, and waste experimental reduction facility operation, February 7-9, 1995

- Review spent nuclear fuel storage, February 14-16, 1995.

- Idaho Chemical Processing Plant fuel transfers process and conduct of operations review, March 28-30, 1995.

- Spent fuel status review, April 10-12, 1995.

- Advanced Test Reactor SAR Review, May 2-4, 1995.

- Radiological Controls and Practices at the Idaho Chemical Processing Plant Tank Farms, June 27-29, 1995

- Electrical, Instrumentation and Control, and Fire Protection Systems review, August 8-10, 1995.

- New Waste Calcine Facility, High Level Waste Processing and Safety Analyses, August 29-31, 1995.

- Annual Emergency Response Exercise and Spent Fuel Review, September 11-15, 1995.

- Seismic Hazard Studies, October 9-12, 1995

Mound Site

- Review the Unload Readiness Assessment process, March 13-16, 1995
- Tritium Review, July 17-20, 1995
- Special Unload Readiness Assessment, September 13-15, 1995.

National Weapon Laboratories

- Board visit to Albuquerque and Los Alamos National Laboratory, January 9-12, 1995.
- Lawrence Livermore National Laboratory. Review maintenance practices, February 7-9, 1995.
- Sandia National Laboratory, Review automated canot process, February 14, 1995.
- Los Alamos National Laboratory, Review plutonium storage, and research and development safety issues, February 14-16, 1995.
- Los Alamos National Laboratory, Qualification Evaluation Process, March 14-15, 1995.
- Los Alamos National Laboratory, Reservoir Surveillance Meeting, March 16-20, 1995.
- Sandia National Laboratory, Plutonium Vulnerability, March 20-23, 1995.
- Los Alamos National Laboratory, Supplemental Directives 5610.10 and 5610.11, April 4-5, 1995.
- Lawrence Livermore National Laboratory, Electrical, instrumentation and control, and fire protection review, April 3-6, 1995.
- Sandia National Laboratory, Emergency Exercise "Rubble Glow," May 15-18, 1995.

- Los Alamos National Laboratory, Plutonium Safety Review, May 17-18, 1995.
- Board visit to Albuquerque for discussions on Managing the Safety of Research and Development and on Recommendation 93-6 archiving activities at the Laboratories, May 24-25, 1995.
- Lawrence Livermore National Laboratory, Resumption Progress, June 6-8, 1995.
- Los Alamos National Laboratory, Surveillance of Operational Safety Requirements, TA-55, Chemical and Metallurgy Research, and Weapons Engineering Treatment Facility, June 13-15, 1995.
- Board visit to Lawrence Livermore National Laboratory, June 21-23, 1995.
- Sandia National Laboratory, Integrated Standards Based Management System, July 10-12, 1995.
- Los Alamos National Laboratory, Research and Development Safety, July 10-13, 1995.
- Board visit to Sandia National Laboratory and Los Alamos National Laboratory, July 12, 1995.
- Lawrence Livermore National Laboratory, Observe the Plutonium Facility, July 24-27, 1995.
- Los Alamos National Laboratory, Safety Analysis Reports and Operations at the Los Alamos Critical Experiments Facility, July 25-27, 1995
- Los Alamos National Laboratory, Weapons Surveillance and Aging Effects, August 8-10, 1995.
- Lawrence Livermore National Laboratory, Readiness Assessment, August 29-31, 1995.
- Lawrence Livermore National Laboratory, Plutonium Standards Development Meeting, September 11-14, 1995.

- Los Alamos National Laboratory, Appaloosa and DAHRT review, September 18-21, 1995.
- Lawrence Livermore National Laboratory, for High Explosives Surveillance Review, November 7-8, 1995.
- Lawrence Livermore National Laboratory, Integrated Safety Management Plan, November 14-16, 1995.
- Board visit to Lawrence Livermore for review with the Department and its contractors of the status of public health and safety issues pertaining to safety in defense nuclear research and development activities at the Lawrence Livermore National Laboratory, December 5-7, 1995

Nevada Test Site

- Review Security Master Study Nuclear Explosive Safety for Device Assembly Facility, January 17-20, 1995.
- Review facility status, safety basis, safety systems, fire protection, and nuclear explosive safety study W48 storage, February 7-9, 1995.
- Exercise KISMET, February 21-23, 1995.
- Exercise KISMET, February 28-March 2, 1995.
- Device Assembly Facility security and Nuclear Explosive Safety Studies, July 26-27, 1995.
- Environmental Protection Programs & Device Assembly Facility Waste Management August 1-3, 1995.
- Emergency Exercise KUCHEN, August 1-3, 1995.
- Emergency Exercise KUCHEN execution, August 7-8, 1995.
- Exercise JIGSAW, November 30, 1995.
- Board visit, November 27-28, 1995.

- Nuclear Explosive Safety Study for the Coded Optical Device Ennoblement System, December 12-14, 1995.

Oak Ridge

- TeleVideo conference, environmental restoration program issues, February 21, 1995.
- Facilities and Inventories Overview, March 13-17, 1995.
- Recommendation 94-4 implementation status, April 10-13, 1995.
- Y-12 Restart Preparations, May 30-June 2, 1995
- Resumption Progress, June 7-8, 1995.
- Special Material Handling Operations, June 23, 1995.
- Observe Special Operations at Y-12, June 27-30, 1995.
- Ventilation Systems Review, July 10-14, 1995.
- Observe Special Operations, July 18-21, 1995.
- Observe Special Operations, July 25-28, 1995.
- Y-12 readiness, August 14-17, 1995.
- Readiness Assessment, August 28-September 1, 1995.
- Board visit on Readiness Assessments, September 6, 1995.
- Readiness Assessment, September 7-8, 1995.
- Criticality Program Review, October 16-18, 1995.
- Highly Enriched Uranium Processing, October 25-27, 1995.

- Task 4 of Recommendation 94-4, Conduct of Operations Assessment, October 31-November 3, 1995.
- Board member visit, December 11-13, 1995.
- K25 Operational Readiness Review, December 11-12, 1995.

Pantex Plant

- Pit storage, February 28-March 2, 1995.
- Review safety issues and tritium reservoir handling, March 28-31, 1995.
- Reviews of Buildings 12-104A and 12-116, April 10-13, 1995.
- Training and Qualifications and Conduct of Operations Review from April 18-21, 1995.
- Reviews of B61 QED, April 24-27, 1995.
- Reviews of B61 Nuclear Explosive Safety Studies, May 23-25, 1995.
- Order Compliance Review, May 30-June 2, 1995.
- SAR review, August 28-30, 1995.
- Reviews of B61-7 SES, November 28-30, 1995.

Rocky Flats

- Transuranic waste review, January 9-13, 1995.
- Unresolved safety question, February 6-9, 1995.
- Follow-up review of Building 371, February 7-9, 1995.
- Pit storage and surveillance testing, February 21-22, 1995.

- Emergency Exercise "Ready 95," March 27-31, 1995.
- Environment, Safety, and Health Review Results, April 11-13, 1995.
- Conduct of Operations and Facility Representative Program, April 17-21, 1995.
- Implementation Plan 94-3 review April 25-27, 1995.
- Plutonium Residues Status, May 2-4, 1995
- Plutonium Safety Review, May 15-16, 1995.
- Hydrogen Generation & Ventilation Review, May 23-25, 1995.
- Exercise "Ready 95," May 31-June 1, 1995.
- Exercise "Ready 95," June 7-8, 1995
- Review of B-771 Structural Integrity Concerns, Recommendation 94-3 Status Update and Unreviewed Safety Question Determinations, June 21-22, 1995.
- Residue Stabilization, July 18-19, 1995
- Board visit to review Bldg. 776 and the Implementation Plan for 94-3 Structural Results, July 24-26, 1995.
- Board Staff Review to include Bldg. 776 and Implementation Plan 94-3 Structural Results, July 27-28, 1995.
- Phase I of Building 771 Operational Readiness Review, August 7-10, 1995.
- Ventilation Review, August 14-17, 1995.
- Plutonium Stabilization, August 22-24, 1995.
- Board visit to review stabilization schedules/Rec. 94-1 (Accelerated Remediation Schedule); performance measures for Kaiser-Hill; structural integrity issues; facility use tradeoffs for Buildings 707 and 779 for material stabilization; and the status of Rec. 94-3 (Seismic Safety - Building 371) September 26, 1995.

- Progress on Recommendation 94-3, November 1-3, 1995.
- Geological Faulting at Los Alamos National Laboratory (Rocky Flats meeting site due to personnel availability), November 1, 1995.
- Authorization Basis, December 6-7, 1995.
- Safety Systems and Components, December 12-14, 1995.

Savannah River Site

- QA and review operational readiness of the Westinghouse Savannah River Company In-Tank Precipitation System, January 10, 1995.
- Separations safety envelope review, February 8-9, 1995.
- Review Defense Waste Processing Facility configuration management, maintenance and ventilation, February 13-16, 1995.
- Rec. 94-1 plutonium storage issues and plutonium vulnerabilities, February 27-March 2, 1995.
- Discuss Tritium Topics, March 13-14, 1995.
- Review Defense Waste Processing Facility and In-Tank Precipitation Conduct of Operation, March 20-23, 1995.
- Plutonium Storage/Vulnerability, April 10-12, 1995.
- In-Tank Precipitation, Safety Envelope, April 24-26, 1995.
- F Canyon Phase II and FB Line Safety, April 27-28, 1995.
- Defense Waste Processing Facility's Assured Confinement, May 3-4, 1995.
- Operational Readiness Review at In-Tank Precipitator, May 17-19, 1995.
- In-Tank Precipitation, Operational Readiness Review, May 22-25, 1995.

- In-Tank Precipitation, Radiation Protection, Waste Management Review and Tritium Storage and Handling Review, June 6-8, 1995.
- Spent Fuel Review, Am-Cm Solidification, Actinide Packaging Facility, Glass Waste Storage Facility, Tritium Reservoir Training, Rad Worker Requalification and Respirator Training, and Plutonium Reprocessing, June 19-21, 1995.
- FB-Line Evaluated Cold Runs and Review of Restart Preparations, July 10-13, 1995.
- Review the In-Tank Precipitation Facility Waste Management and Environmental Programs, August 2-3, 1995.
- Safety Review, August 14-17, 1995.
- Training, Qualifications and Conduct of Operations at the Defense Waste Processing Facility, August 21-24, 1995.
- FB-Line Validation Runs, September 25-29, 1995.
- Structural Reviews of the Defense Waste Processing Facility, Electrical, Instrumentation & Controls, and Fire Protection, September 27-29, 1995.
- Defense Waste Processing Facility review, October 4-6, 1995.
- Safety Analysis at the Defense Waste Processing Facility, October 25-26, 1995.
- In-Tank Precipitation, Benzene Issue Resolution, November 8-9, 1995.
- Defense Waste Processing Facility, Westinghouse Savannah River Operational Readiness Review, November 14-16, 1995.
- FB-Line Restart Evaluation, F-Canyon Phase II Restart Preparation and Emergency Preparedness, November 13-17, 1995.
- Board member visit November 15-17, 1995.
- Safety Related Equipment and Components, November 28-December 1, 1995.

- Operational Readiness Review at the Defense Waste Processing Facility and Radioactive Operations, December 11-15, 1995.

Waste Isolation Pilot Plant

- Transuranic Program Review, July 17-19, 1995.

Appendix B
Key Department/Board Correspondence in 1995

From the Board to the Department:

- On January 31, 1995, the Board forwarded to the Departmental Representative a staff report entitled "Qualification Evaluation Process."
- On February 3, 1995, the Board provided to the Assistant Secretary for Defense Programs an observation report on 1994 Nuclear Explosive Safety Studies and Nuclear Explosive Risk Assessments.
- On February 3, 1995, the Board forwarded to the Under Secretary a letter noting major deficiencies with the proposed revision of Order 4700.1.
- On February 17, 1995, the Board forwarded to the Secretary its Fifth Annual Report to Congress.
- On February 22, 1995, the Board provided to the Secretary its comments on the "Alternative Futures for the Department of Energy National Laboratories" Report.
- On February 23, 1995, the Board forwarded a letter to the Secretary concerning the Implementation Plan for Recommendation 93-5.
- On March 28, 1995, the Board forwarded a letter accepting the Department's Implementation Plan 94-4.
- On March 28, 1995, the Board forwarded a letter to the Assistant Secretary for Environmental Management confirming the Board's concurrence that the Board's issues raised in the review of the Department's "Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Draft Environmental Impact Statement" (DOE/EIS-0203-D) were adequately resolved.
- On April 5, 1995, the Board forwarded a letter to the Secretary addressing the Implementation Plan for Recommendation 93-6. The Board is concerned with late commitments. In particular, they are

concerned with the overdue program to identify and capture skills and knowledge of individuals who have been engaged for many years in the assembly, disassembly and testing of nuclear weapons. Secondly, they were concerned that efforts to remove administrative obstacles to gain needed access to retirees was stalled.

o On April 14, 1995, the Board forwarded a letter to the Assistant Secretary of Defense Programs addressing the Board's concerns over four recent documents that originated from the office's of Defense Programs. The Board's concerns were that the documents could negatively impact the Department's execution of the Implementation Plan 93-1, "Standards Utilization in Defense Nuclear Facilities." The documents concern development of Orders and standards at nuclear explosive facilities and assessment of compliance with Orders and standards at Department defense nuclear facilities.

o On April 17, 1995, the Board transmitted a letter to the Assistant Secretary for Environmental Management addressing deficiencies at Rocky Flats in the conduct of Emergency Preparedness during exercise "Ready 94". The Board has requested, within 90 days, the Department's plans to address the deficiencies in the exercise and corrective action for the shortcomings in Emergency Preparedness identified by the Department over the past three years.

o On April 18, 1995, the Board transmitted a letter to the Associate Deputy Secretary for Field Management addressing Recommendation 92-2. The letter addresses the Board's concerns over the lack of progress in initiating Facility Representative programs at some Department facilities and improving weak programs at other facilities. The Board is also concerned over the lack of progress in establishing a continuing career progression program for Facility Representatives. The Board has asked for a brief regarding measures planned for sites that have not demonstrated progress toward implementing the Facility Representative qualification program.

o On April 24, 1995, the Board transmitted a letter to the Secretary addressing radiation protection programs and the cost estimates of sites to achieve compliance with the Department's Orders and rule. The Board requests that the Department provide a report within 60 days that addresses the following:

1. For fiscal years 1993 through 1996, identify the costs already incurred, and those projected for the future, to meet radiological safety requirements contained in Order 5480.11, 10 CFR Part 835, and other radiological protection standards which the Department deems necessary to ensure adequate protection of public health and safety at defense nuclear facilities.

2. Provide the documentation which served as the basis for the cost estimates and state the reasons for the higher costs at the sites listed in the letter which required more than $10 million to achieve compliance.

3. Provide cost details for the fiscal years 1993 through 1996 in the following categories related to radiological controls: equipment, capital construction, administrative, overhead, personnel, auditing, oversight, training development and implementation.

o On April 28, 1995, the Board transmitted a letter to the Assistant Secretary for Defense Programs addressing efforts to improve the Nuclear Explosive Safety Study process. The Board forwarded a report of the staff's visit to the Nevada Operations Office where Nuclear Explosive Safety Studies evaluated the interim storage of W-48 weapons in bunkers within Area 27 of the Nevada Test Site. The Board also expressed concerns with the late arrival of the Nuclear Explosive Safety Studies Input Document and its lack of thoroughness. They also questioned its value as a measure of readiness from the nuclear explosive safety perspective to safely conduct the operation observed by the staff.

o On April 28, 1995, the Board transmitted a letter to the Secretary addressing effective means to manage the safety of research and development activities while maintaining the flexibility needed to conduct Research and Development in support of national security objectives. The Board has requested within 90 days a report from the Department addressing three issues:

1. The adequacy of the guidance given by the Department to the field to ensure that the integrated safety management systems under development at the Department's defense nuclear laboratories will contain and implement an appropriate set of safety requirements and adequate management structures that incorporate and are consistent with

the intent of Standards/Requirements Identification Documents commitments.

2. A description of how the Department plans to address the need for adequate technical talent, mechanisms and acceptance criteria to review and expeditiously approve tailored integrated safety management systems at these laboratories, including appropriate disposition of proposed technically-justified equivalencies and exemptions.

3. A summary of actions needed to coordinate Department line management and independent oversight safety audits at the weapons laboratories.

o On May 5, 1995, the Board forwarded a letter to the Secretary conditionally accepting Implementation Plan 94-1, Improved Schedule for Remediation. The three conditions were:

1. The implementation of Recommendation 94-1 should be directed by a dedicated project organization.

2. The Department will remain committed to bringing all plutonium metal and oxide into conformance with the 50-year storage standard by May 2002.

3. The Department will aggressively move to acquire all necessary resources, perform all needed research and development to meet the projected milestone, and fulfill all legal requirements. The urgency motivating Recommendation 94-1 implies that the Department is expected to avail itself of the flexibility provided by the National Environmental Protection Act and other relevant statutes, in the event more expeditious action is necessary or appropriate, to meet the schedules in the Board's Recommendation and the Implementation Plan.

o On May 5, 1995, the Board forwarded Recommendation 95-1 to the Secretary. The Recommendation deals with "Improved Safety of Cylinders Containing Depleted Uranium". In summary, the Recommendation addresses problems associated with 50,000 cylinders of UF_6 in outdoor storage at the three gaseous diffusion plants. The Board contends that poor maintenance and storage conditions, combined with mechanical damage suffered during handling, have led to corrosion and subsequent breaching of several of these carbon steel cylinders. The Board recommends: "To protect against the dispersal of large amounts of uranium to soil and ground water in years to come, an early start to remedial action should be planned and then instituted. The alternatives could be a massive problem with extraordinary financial costs.

1. An early program be started to renew the protective coating of cylinders containing the tails from the historic production of enriched uranium.

2. The possibility of additional measures be explored, to protect these cylinders from the damaging effects of exposure to the elements, as well as any additional handling that may be called for.

3. A study be instituted to determine whether a more suitable chemical form should be selected for long-term storage of the depleted uranium."

- On May 5, 1995, the Board transmitted a letter to the Assistant Secretary for Defense Programs concerning a report identifying the formal process(es) the Los Alamos National Laboratory is following to identify and mitigate hazards in the design, construction, and preparation for operation of new and upgraded defense nuclear facilities. In particular, the Board's letter provided two trip reports on visits to the Chemistry and Metallurgy Research building upgrades project and the TA-55 Plutonium Facility. Their comments concerned the need for emergency standby power and strengthening of configuration management activities.

- On June 13, 1995, the Board transmitted a letter to the Assistant Secretary for Environment, Safety and Health which provided a review of DOE-STD-1023-94, "Natural Phenomena Hazards Assessment Criteria."

- On June 14, 1995, the Board transmitted a letter to the Assistant Secretary for Defense Programs addressing activities at Lawrence Livermore National Laboratory's Plutonium Facility (Building 332). The letter discusses a recent staff review that determined that various building safety systems were not being monitored as required. In particular, it was observed that there existed a lack of assurance that the

Plutonium Facility was complying with the Limiting Conditions for Operations specified in the approved Technical Safety Requirements. In addition, surveillance requirements established to ensure operability of such safety systems as emergency power, fire protection and ventilation had not been met. The Board requested the Department's plan for addressing the issues that led to the Technical Safety Requirement violations.

o On June 15, 1995, the Board forwarded a letter to the Secretary conditionally accepting Implementation Plan 94-2, Conformance to Safety Standards at Low-Level Nuclear Waste and Disposal Sites. The three conditions were:

1. The Department approval of performance assessments needs to be based on the entire Low-Level Waste inventory located on a site such that the offsite consequences of the collection of these sources can be established.

2. The plan to perform a preliminary analysis as a precursor to the final performance assessment is acceptable to conserve resources. However, this effort should be accomplished as a continuum rather than as separate sequential studies.

3. A quarterly report be submitted to the Board.

o On June 15, 1995, the Board forwarded a letter to the Secretary addressing the recently completed two-year review of the design, construction, maintenance, and operation of ventilation systems in the Department's plutonium processing facilities. The Board requested that the Department provide a report within 180 days addressing the following:

- a report that evaluates the design, construction, operation and maintenance of ventilation safety systems at the Department's plutonium processing and handling facilities in terms of applicable Department and consensus standards; and

- subsequent to the above review, a plan that details any corrective actions deemed necessary by the Department and the results of USQ review where this is found to be appropriate.

- On June 30, 1995, the Board forwarded a letter to the Assistant Secretary for Environment, Safety and Health expressing concerns over statements to the Subcommittee on Energy and Water Development of the House Committee on Appropriations, House of Representatives on March 8, 1995.

- On July 24, 1995, the Board forwarded a letter to the Assistant Secretary for Defense Programs indicating that they had received and accepted the revised guidance for the conduct of readiness reviews for nuclear testing, termed "Testing Readiness Assessments." The guidance was developed in response to the Board's Recommendation 92-6, Operational Readiness Reviews, and was revised to address the Board's letter of December 9, 1994. The Department has committed to use the interim Testing Readiness Assessment process until additional guidance to be developed under Recommendation 93-1 is available

- On July 24, 1995, the Board forwarded a letter to the Under Secretary addressing the Board's concerns with the status of fulfilling commitments under the 91-6 Implementation Plan. The Board requested that the Department provide a) revised due dates, b) the problems that caused the delays, c) corrective actions, and d) the single Department official who has overall authority and responsibility for the Implementation Plan.

- On July 25, 1995, the Board forwarded a letter to the Assistant Secretary for Defense Programs addressing issues with the implementation of Recommendation 93-1, Standards Utilization in Defense Nuclear Facilities. The Board had previously sent a letter on the same subject on April 14, 1995. In particular, the Board accepted a one-month delay in the Department providing the final Orders, guides, and standards, as they apply to Order 5610.10, "Nuclear Explosive and Weapon Surety Program" and Order 5610.11, "Safety of Nuclear Explosive Operations". Several concerns with the draft orders were also addressed.

- On July 31, 1995, the Board forwarded a letter to the Assistant Secretary for Human Resources and Administration which provided the Board staff's comments on the Department Implementation Plan SAI-44, "Corporate Approach to Training in the Department of Energy," dated

June 16, 1995. The Board requested a briefing on the SAI-44 Implementation Plan due to its potential impact on the implementation of Board Recommendation 93-3 and the observation that "Implementation of Technical training related to [Board] recommendations is inconsistent and unclear."

- On August 1, 1995, the Board forwarded a letter to the Assistant Secretary for Environment, Safety and Health which responded to the Assistant Secretary's letter of July 21, 1995 concerning statements to the Subcommittee on Energy and Water Development of the House Committee on Appropriations, House of Representatives on March 8, 1995.

- On August 2, 1995, the Board forwarded a letter to the Secretary which responded to the Secretary's letter of July 11, 1995 concerning Recommendation 93-5. The Board accepted the stated intent to delete two commitments from the Implementation Plan. The letter also acknowledged that the Department will be forwarding a revised Implementation Plan for review later in 1995.

- On August 3, 1995, the Board forwarded a letter to the Assistant Secretary for Environmental Management concerning the structural integrity of Buildings 771 and 776/777 at the Rocky Flats Environmental Technology Site. Due to the potential hazards in the buildings and the apparent lack of Department or contractor identification of the hazards, the Board has requested, within 60 days, a report from the Department to address the root causes and corrective action to prevent recurrence.

- On August 7, 1995, the Board forwarded a letter to the Assistant Secretary for Environmental Management concerning the In-Tank Precipitation Facility's high level waste tanks at the Savannah River Site. The Board expressed concern over the potential seismic activity accident scenario which could result in significant off-site consequences. Due to the potential consequences of a spill and the Board's determination that the draft document, "Spill Contingency Plan for H-Area Tank Farm," dated June 28, 1995, did not adequately address accidents, the Board has requested that the Department within 60 days, provide a report to address four potential accident issues.

- On August 11, 1995, the Board's Technical Director forwarded a letter to the Director of the Office of Engineering, Operations, Security, and Transition Support concerning Board staff comments on the draft standard, "Criteria for Safe Storage of Plutonium-Bearing Materials (excluding Metals and Oxides Containing Greater than 50 Weight Percent Plutonium)."

- On August 23, 1995, the Board forwarded a letter to the Secretary concerning the changing mission at Rocky Flats. The Board concluded that the consolidation of nuclear materials, as discussed in Recommendation 94-1, may cause the hazards workers face during decommissioning of aging nuclear facilities to exceed those encountered during operation of those nuclear facilities. The Board concluded that their oversight activities would be increased by assigning two technical staff personnel to serve as the Board's Site Representatives at Rocky Flats. As such, two Board staff personnel will arrive on site by October 2, 1995.

- On September 11, 1995, the Board forwarded a letter to the Assistant Secretary for Defense Programs concerning a recent visit to Los Alamos National Laboratory to review surveillance of Operational Safety Requirements. The Board staff noted significant improvement in the surveillance of TA-55, improved surveillance procedures, better evolution control, improved review of record data, and greater formality of operations. Observations of the Chemistry and Metallurgy Research building, on the other hand, indicated that surveillance procedures and their implementation lacked the needed formality.

- On September 12, 1995, the Board forwarded a letter to the Secretary concerning the Implementation Plan for Recommendation 94-5, Integration of Department of Energy Safety Rules, Orders and Other Requirements. The Board, in their letter, noted that the Implementation Plan detailed several key documents that are still under development. As a result of the non-availability of the documents, the Board has deferred determination of the adequacy of the Implementation Plan until those documents are available for review. The first of the six referenced documents is committed to be available by September 15, 1995 and the last by October 30, 1995.

- On October 3, 1995, the Board forwarded a letter to the Secretary accepting the Implementation Plan for Recommendation 94-3, Rocky Flats Seismic and System Safety. The Board offered one comment on the Implementation Plan: "Although the initial schedule provided in the implementation plan was overly optimistic, DOE-Rocky Flats has recently developed a revised schedule that provides additional time to complete the Phase I efforts. The implementation plan should be revised to reflect this schedule."

- On October 4, 1995, the Board forwarded a letter to the Assistant Secretary for Environmental Management concerning the Implementation Plan for Recommendation 93-4, Environmental Restoration Management Contracts. The Board expressed concerns that the Technical Management Plan concept had not been integrated into the activities of the 1993 Contract Reform Team nor the Process Improvement Team tasked with revising the DOE Order 4700.1. Order 4700.1 has been subsumed into the new order on Life Cycle Asset Management. The Board requested that the Department provide within 90 days:

  1. A revision to the 93-4 Implementation Plan, including deliverables and milestone dates, that includes the method by which the Technical Management Plan concept will be incorporated into future Department contracts.

  2. A reconciliation of departmental efforts to define Department responsibilities via the generic Technical Management Plan, the Environmental Management Safety and Health Integrated Plan, the Functions and Responsibilities Manual and the Defense Programs Operations Manual. This effort is to provide a basis for the development of a Department-wide standards-based safety management plan--a plan that is not inconsistent with the Technical Management Plan and may include the Technical Management Plan.

- On October 6, 1995, the Board forwarded a letter to the Assistant Secretary for Environmental Management expressing its continuing interest in the status of emergency preparedness throughout the complex and provided a copy of the Board staff report on Exercise "Ready 94" at the Rocky Flats Environmental Technology Site. The Board requested to be notified in writing within 90 days of the actions the Department planned for addressing specific negative items identified in the report and shortcomings in emergency preparedness identified by the Department's own evaluation over the past three years. In addition, the Board requested within ten days, the reasons for the delay in responding to its April 17, 1995 letter concerning the same subject, exercise "Ready 94."

- On October 11, 1995, the Board forwarded Recommendation 95-2, Safety Management, to the Secretary. Recommendation 95-2 addresses the use of standards by contractors at Department facilities and the level of conduct of operations to be maintained at these facilities. It acknowledges that three previously promulgated Recommendations (90-2, 92-5, and 94-5) intersect in many of their implications.

- On October 13, 1995, the Board forwarded to the Assistant Secretary for Environmental Management comments from a staff review of the draft site evaluation survey for low-level waste management. The comments provide the Board's "cradle to grave" approach that will parallel that required by the Resource Conservation and Recovery Act for other waste management areas, i.e., disposal of hazardous waste. The comments were provided by the Board to assist the Department in developing the scope and content of the vulnerability assessment portion of Recommendation 94-2.

- On October 13, 1995, the Board forwarded to the Assistant Secretary for Environmental Management a letter which referenced an earlier Board letter of August 7, 1995. This series of letters relates to spill contingency plans for the High Level Waste Tank Farms at Savannah River. The Board expressed concerns that the August 7, 1995 letter deficiencies had not been completely addressed in an October 6, 1995 letter from the Assistant Manager of High-Level Waste, at DOE-Savannah River Site. The Board's August 7, 1995 letter required an answer within 60 days which the Board estimated to be sufficient time to complete the entire task. The Board's October 13, 1995 letter indicated an additional "30 to 45 days should be more than ample time to complete the reporting requirements."

- On October 24, 1995, the Board forwarded to the Secretary, a letter which closed five Recommendations. The closing of the five Recommendations was the result of a joint effort between the Board and

Department staffs to develop a closure and consolidation of commitments of fully implemented or outdated Board Recommendations. The Board closed:

1) Recommendation 90-5 (Systematic Evaluation Program for Rocky Flats), "Changes in mission at the Rocky Flats Environmental Technology Site and other actions resulted in the recommendation being overtaken by events."

2) Recommendation 90-6 (Plutonium in the Ducts at Rocky Flats), "This Recommendation has become outdated."

3) Recommendation 92-6 (Requirements and Guidance for Operational Readiness Reviews), "Issuance of revised DOE Order on Operational Readiness Reviews closes this recommendation."

4) Recommendation 92-5 (Conduct of Operations at Defense Nuclear Facilities), "This Recommendation would be superseded by Recommendation 95-2."

5) Recommendation 90-2 (DOE's Nuclear Safety Standards Program), "DOE is currently revising its schedule for development and implementation of Standards/Requirements Identification Document (S/RID). The revised schedule will then be consolidated with Recommendation 94-5. Recommendation 95-2 provides additional information which would apply to Recommendation 90-2 closure."

o On November 1, 1995, the Board forwarded a letter to the Secretary accepting the Implementation Plan for Recommendation 95-1, Improved Safety of Cylinders Containing Depleted Uranium. The Board viewed favorably the current activities underway to resolve the issues addressed in the Recommendation.

o On November 2, 1995, the Board forwarded a letter to the Deputy Secretary concerning Department safety orders and safety rules. The Board expressed concerns that they had not received a promised tracing of the existing safety requirements contained in the 52 Orders of interest to the Board and their concomitant revised Orders, rules and other requirements (the cross walk). In addition, the Board indicated that they had not received all of the guidance documents and standards that are necessary to evaluate the set of the Department's safety requirements and guidance as a whole.

- On November 9, 1995, the Board forwarded a letter to the Assistant Secretary for Environmental Management forwarding DNFSB/TECH-7, "Stabilization of Deteriorating Mark 16 and Mark 22 Aluminum-Alloy Spent Nuclear Fuel at the Savannah River Site." This report, prepared by a Board staff team, examines the dry storage and chemical processing alternatives for stabilizing the Mark 16 and Mark 22 spent fuel. This report is in reference to Recommendation 94-1.

- On November 15, 1995, the Board forwarded a letter to the Secretary concerning Recommendation 94-1. Improved Schedule for Remediation. This letter addressed the Board's concerns with the Department's future plans for F-Canyon and H-Canyon chemical process facilities that would be used to process fuel elements. The Board asserts that the Department needs to maintain the capability for chemical processing of spent nuclear fuel since this is the only proven safe way by which radioactive material can be converted into a form suitable for ultimate geologic disposal. This means that the capability now existing at Savannah River continues to be essential.

- On November 15, 1995, the Board forwarded a letter to the Secretary concerning Recommendation 94-1, "Improved Schedule for Remediation." The letter addressed the Board's concerns with Mark 16 and Mark 22 fuel elements stored in basins at the reactors and processing canyons at Savannah River Site. The Board believes that deferring the decision to chemically treat the Mark 16/22 fuel and similar material while dry storage is investigated is inappropriate. The Board considers the logical and safe approach to follow is to chemically treat the materials and convert them into components whose safe management is currently available.

- On November 21, 1995, the Board forwarded a second letter (also on November 2, 1995) to the Deputy Secretary concerning the revision of the Department safety orders, rules, and standards. Numerous safety documents have been issued for use without prior review by the Board or its staff. The Board reiterated that they are responsible for reviewing those documents prior to issuance. The Board provided copies of previous Department commitments over the past five years which indicated that the Department would provide the revised safety documents for Board review prior to their issuance.

- On December 5, 1995, the Board forwarded to the Secretary a letter addressing concerns with the Department's commitments in the Implementation Plan for Recommendation 94-5, Integration of Department Safety Rules, Orders and Other Requirements. The Department committed to providing the Board with a revised Functions and Responsibilities Manual by February 1, 1996. The manual, by which the Department defines the safety roles and responsibilities of Department organizational elements, has "long been out-of-date." The Board lacks confidence that the FAR Manual will be updated as scheduled. The Board requests that the Department provide within 10 days: 1) a status report, 2) the name of the responsible Department manager, and 3) interim milestones.

- On December 5, 1995, the Board forwarded to the Assistant Secretaries for Environmental Management and Environment, Safety and Health a letter which referenced Hanford Site Tank Farms operations. The Board raised issues with line management processes used to review and approve changes in established safety limits.

- On December 5, 1995, the Board forwarded to the Secretary a letter which referenced the Secretary's letter of December 4, 1995 requesting a 45-day extension to respond to the Board Recommendation 95-2, Safety Management; the Board granted the extension from December 4, 1995.

- On December 15, 1995, the Board forwarded to the Assistant Secretary for Environmental Management a letter which discussed a review of the design criteria for the Spent Nuclear Fuel Project's Canister Storage Building at Hanford. The Board reiterated its view that design criteria issues be resolved early in the design process.

- On December 18, 1995, the Board forwarded to the Assistant Secretary for Environmental Management a letter which discussed deficiencies observed in a site visit to Savannah River for an emergency preparedness annual exercise. The Board requested that the Department provide justification that the Central Training Facility has the ability to respond to postulated accidents originating from nearby hazardous facilities. A report was requested within 75 days.

- On December 22, 1995, the Board forwarded to the Secretary a letter which designated specific Board members and staff members to represent the Board in discussions about the comparability of the Necessary and Sufficient concept with the concept set forth in Recommendation 95-2, Safety Management.

Trip Reports:

- On January 9, 1995, the Board provided to the Assistant Secretary of Environmental Management a trip report concerning In-Tank-Precipitation issues at Savannah River Site.

- On February 22, 1995, the Board provided the Departmental Representative the following trip reports:

Date of Report	Site	Subject
11/1/94	Pantex	Radiation Protection Review
10/12/94	INEL	Basins
9/29/94	Fernald	Uranium/Thorium Interim Storage Safety Review
9/14/94	Hanford	Supplementary Report on Emergency Response Exercise Fraser
8/24/94	LLNL	Pu Storage
8/16/94	NTS	Radiation Protection Program
11/23/93	Hanford/ INEL/SRS	Spent Fuel Storage Basins
10/18/93	Fernald	Uranyl Nitrate Hexahydrate Stabilization Project, K-65 Projects; Training, Technical Safety Requirements, Safety Analysis Reports
6/3/93	SRS	Spent Fuel Storage
11/14/92	Hanford	Assessment of Tank 101-SY
9/18/92	Fernald	Uranyl Nitrate Hexahydrate Stabilization Project
9/15/92	Hanford	Operational Readiness Reviews
7/9/92	Hanford	Evaporator 242A Review, Pu Finishing Plant and Uranium Oxide Plant Schedule Review

- On March 28, 1995, the Board forwarded to the Assistant Secretary of Environmental Management a trip report on the Conduct of Operations at the Idaho Chemical Processing Plant High Level Waste Tank Farm Upgrade Project at the Idaho National Engineering Laboratory.

- On March 28, 1995, the Board provided the Departmental Representative the following trip reports:

Date of Report	**Site**	**Subject**
2/17/95	Oak Ridge	Recommendation 94-4
11/23/93	Multiple sites	Spent Fuel Storage Bins at Multiple Sites
12/1/94	Multiple sites	Nuclear Explosives Safety Study and Nuclear Explosives Risk Assessment at Multiple Sites

- On March 28, 1995, the Board provided the Departmental Representative the following trip reports:

Date of Report	**Site**	**Subject**
12/1/94	Pantex/ LLNL/NTS	Nuclear Explosives Safety Study and Nuclear Explosives Risk Assessment
11/23/94	Hanford/ INEL/SRS	Spent Fuel Storage Basins
9/30/94	SRS	M-Area Unirradiated Fuel Facility
11/29/94	SRS	Waste Management Review
12/12/94	SRS	In-Tank Precipitator Review of Emergency Ventilation
12/14/94	SRS	In-Tank Precipitator Facility Review

- On April 10, 1995, the Board provided the Departmental Representative the following trip reports:

Date of Report	**Site**	**Subject**
10/4/94	Hanford	Systems Engineering Activities
11/28/94	Hanford	Systems Engineering Review
4/4/95	SRS	Radiation Protection Case Study of D&D at Old HB Line
5/3/94	SRS	Review of Preparations for D&D/SED

5/4/94	SRS	Replacement Tritium Facility, Conduct of Operations
6/6/94	SRS	F-Canyon and FB-line Order Compliance
9/27/94	SRS	Startup Preparations at In-Tank Precipitator
12/7/94	SRS	F-Canyon and FB-line Safety Envelopes

- On April 12, 1995, the Board provided the Departmental Representative the following trip report

Date of Report	Site	Subject
4/12/95	SRS	F-Canyon safety envelope for Phase II

- On April 19, 1995, the Board provided the Departmental Representative the following trip reports:

Date of Report	Site	Subject
1/30/95	INEL	Backup Power Supply Systems
9/16/94	INEL	Tritium Testing and Safety Analyses, Advanced Test Reactor
1/9/95	Rocky Flats	Backup Power Supply System
12/29/94	Rocky Flats	Trenching at Rocky Flats
1/17/95	SRS	In-Tank Precipitator Order Compliance Review
4/8/94	SRS	Old HB Line
10/5/94	SRS	Defense Waste Processing Facility Environmental Impact Statement
10/17/94	All	Department Implementation Guide for Sealed Radioactive Source Accountability and Control

- On May 15, 1995, the Board provided the Departmental Representative the following trip reports:

Date of Report	Site	Subject
11/23/94	Hanford	K-Basin Chute Barriers
3/10/95	INEL	Waste Management and Environmental Restoration
2/6/95	Rocky Flats	Radioactive Waste Management Review
12/27/94	Rocky Flats	Restart Activities
3/16/95	SRS	DOE Order 6430.1A Compliance Review of In-Tank Precipitator
3/6/95	SRS	In-Tank Precipitator Operational Readiness Review Process & QA
2/4/95	SRS	In-Tank Precipitator & Defense Waste Processing Facility, Electrical, Instrumentation & Control Review
1/27/95	SRS	Recommendation 94-1, Americium/Curium Processing
1/23/95	SRS	Spent Fuel Storage

- On June 14, 1995, the Board transmitted a letter to the Assistant Secretary for Environmental Management enclosing the following trip report:

Date of Report	Site	Subject
5/10/95	SRS	In-Tank Precipitation Safety Envelope Review

- On June 22, 1995, the Board transmitted a letter to the Assistant Secretary for Defense Programs enclosing the following trip report:

Date of Report	Site	Subject
5/11/95	Pantex	Reviews of the Special Nuclear Material Component Staging Facility (Building 12-116) and the

		Weapon Special Purpose Replacement Complex (Building 12-A)

- On June 23 1995, the Board transmitted a letter to the Assistant Secretary for Nuclear Energy enclosing the following trip report:

Date of Report	**Site**	**Subject**
5/23/95	ATR	Safety Analyses and Thermal Hydraulic Performance of the Advanced Test Reactor

- On July 5, 1995, the Board transmitted a letter to the Departmental Representative enclosing the following twenty trip reports:

Date of Report	**Site**	**Subject**
5/22/95	Hanford	Decommissioning
4/26/95	Hanford	High Level Waste Tank Safety and Characterization
4/24/95	Hanford	Recommendation 92-4 and Tank Farm Activities
4/20/95	Hanford	K-Basin Radiological Engineering Assessment
3/16/95	Hanford	Derivation and Implementation of Tank Farm Operational Safety Requirements
4/24/92	Hanford	Review of Radiological and Environmental Safety Programs
1/5/95	Mound	Special Unload Operations
10/6/94	Pantex	Review W-55 Issues
9/23/94	Pantex	Emergency Plan Exercise
8/23/94	Pantex	Order Compliance
6/30/94	Pantex	Ventilation Systems
1/7/94	Pantex	Rad Generating Devices
5/4/95	Rocky Flats	Facility Reps
3/27/95	Rocky Flats	Radiolytic Hydrogen Generation in Plutonium-Nitric Acid Solution Tanks

3/14/95	Rocky Flats	Criticality Safety and Building 707 Thermal Stabilization Preparations
5/17/95	SRS	Training and Qualification at In-Tank Precipitator
2/23/95	SRS	Ventilation & Configuration Management at Defense Waste Processing Facility
2/17/95	SRS	Implementation of 90-2 & 92-2 at Defense Waste Processing Facility
6/3/92	SRS	K-Reactor Axial Power Monitors
1/12/94	Other	DOE Fifteenth Annual Low-Level Radioactive Waste Management Conference

o On July 11, 1995, the Board forwarded a letter to the Assistant Secretary for Environmental Management addressing a staff team review of the Savannah River Site on March 20-24, 1995. The review addressed the conduct of operations and engineering at the Defense Waste Processing Facility and In-Tank Precipitation Facility. An enclosed report provided a summary of observations made during the review.

o On July 21, 1995, the Board forwarded a letter to the Assistant Secretary for Environmental Management addressing a staff team review of Rocky Flats on May 22-25, 1995. The review concerned selected plutonium buildings and noted that maintenance in Building 371 has deteriorated to an unacceptable level. The Board requested that the Department respond to the deficiencies noted at Building 371 in the Department's response to the Board's June 15, 1995 letter on an "Overview of Ventilation Systems at Selected DOE Plutonium Processing and Handling Facilities."

o On July 26, 1995, the Board provided the Departmental Representative the following trip report:

Date of Report	Site	Subject
2/17/95	NTS	Device Assembly Facility Review

- On August 3, 1995, the Board forwarded to the Assistant Secretary for Environmental Management a trip report on the Hanford Site:

Date of Report	Site	Subject
6/22/95	Hanford	B Plant/Waste Encapsulation & Storage Facility Review

- On August 3, 1995, the Board forwarded to the Assistant Secretary for Environmental Management a trip report on the Savannah River Site:

Date of Report	Site	Subject
7/14/95	SRS	Spent Nuclear Fuel at SRS

- On August 23, 1995, the Board forwarded to the Assistant Secretary for Environmental Management a trip report on the Hanford Site:

Date of Report	Site	Subject
7/14/95	Hanford	Evaluation of Estimated Life of Mixer Pump for Tank 101-SY

- On September 5, 1995, the Board forwarded to the Assistant Secretary for Environmental Management a trip report on the Hanford Site:

Date of Report	Site	Subject
8/15/95	Hanford	Implementation Plan for Recommendation 93-4 Richland Operations Office Technical Management Plan

- On September 8, 1995, the Board forwarded to the Assistant Secretary for Environmental Management a trip report on the Hanford Site:

Date of Report	Site	Subject
7/17/95	Hanford	Review of Procedures at the Hanford Site

- On October 3, 1995, the Board forwarded to the Assistant Secretary for Defense Programs a trip report concerning the Department's efforts to correct the deficiencies identified by the Nuclear Explosive Safety Study independent review team in its report of May 6, 1994. The trip report includes Board staff observations from three Nuclear Explosives Safety Study meetings and concludes that although significant progress in enhancing the Nuclear Explosives Safety Study process has occurred, more progress still needs to be made.

- On October 12, 1995, the Board forwarded to the Assistant Secretary for Environmental Management a trip report concerning a staff review visit on August 8 - 10, 1995 to the High Level Liquid Waste Evaporator and the New Waste Calcining Facility at the Idaho Chemical Processing Plant. The Board noted that although the Distributed Control System is relied upon for safe shutdown of the facility, it is not subjected to the level of rigor in the design review, testing and maintenance associated with such a system.

- On October 12, 1995, the Board forwarded to the Assistant Secretary for Environmental Management a trip report concerning a staff review visit to the Savannah River Site on August 21-25, 1995. The review included training, qualifications, and conduct of operations for the Defense Waste Processing Facility. Significant deficiencies were noted in all three areas.

- On October 13, 1995, the Board forwarded to the Assistant Secretary for Environmental Management a trip report concerning a staff review visit to the New Waste Calcining Facility at the Idaho Chemical Processing Plant on August 29-31, 1995. The Board noted that operator controls, including temperature monitoring and audio monitoring of kerosene ignition, are not proceduralized or raised to the level of Technical Specifications.

- On October 13, 1995, the Board forwarded to the Assistant Secretary for Environmental Management a trip report concerning a staff review visit on August 15, 1995 to resolve the safety bases of In-Tank Precipitation Facility wash cycle operations at Savannah River Site.

- On October 24, 1995, the Board provided the Departmental Representative the following trip reports:

Date of Report	Site	Subject
7/27/95	Fernald	Low Level Waste and OU-4 Vitrification Pilot Plant
8/8/95	Hanford	High Level Waste Tank Safety and Characterization
7/31/95	Hanford	Recommendation 92-4.
7/25/95	INEL	Chemical Processing and Safety Basis
8/25/95	RF	Ventilation for Bldgs. 371, 776/777, 881, 883, and 886.
7/31/95	Sandia	Emergency Response Exercise "Rubble Glow"
8/21/95	SRS	F-Canyon, Safety Envelope and Americium/Curium Processing
6/2/95	SRS	F-Canyon and FB-Line Safety Envelopes

- On November 3, 1995, the Board forwarded a trip report to the Assistant Secretary for Defense Programs concerning a review of the Los Alamos Critical Experiment Facility operations and safety analysis documentation on July 25-27, 1995. An area of concern to the Board was the use of Technical Specification Requirements that predate the issuance of Order 5480.22 and are critical to the safe operation of the Los Alamos Critical Experiment Facility operation.

- On November 6, 1995, the Board forwarded to the Assistant Secretary of Environmental Management a trip report, completed September 27-29, 1995, concerning electrical and structural design and construction of the Defense Waste Processing Facility at the Savannah River Site. The Board noted two issues which required resolution before startup. The issues concerned the sequencing of loads on the emergency diesel generator and the separation between the safety and non-safety electrical busses.

- On December 20, 1995, the Board forwarded to the Assistant Secretary for Defense Programs a letter which discussed the Board staff's assessment of Y-12 progress in resuming operations in those facilities which support the Receipt, Storage and Shipment of the Special Nuclear Materials mission area. An attachment to the letter was a trip report dated November 3, 1995.

From the Department to the Board:

- On January 9, 1995, the General Counsel forwarded to the Board a draft Policy Statement on Procedures for Developing, Implementing and Achieving Compliance with Nuclear Safety Requirements.
- On February 7, 1995, the Department transmitted a preliminary report to the Board addressing criticality safety at Rocky Flats.
- On February 10, 1995, the Department transmitted to the Board its tenth bimonthly progress report on Recommendation 92-6.
- On February 10, 1995, the Department transmitted to the Board a letter to inform them that the Stockpile Stewardship Report would be delayed from February 1, 1995 to March 1, 1995.
- On February 13, 1995, the Department transmitted to the Board a progress report providing information on Action 5 of the Implementation Plan for Recommendation 93-1.
- On February 13, 1995, the Department transmitted to the Board its quarterly status report for the first quarter of the Fiscal Year 1995 on Recommendation 93-2.
- On February 14, 1995, the Department transmitted a 45-day extension request to the Board for Recommendation 94-2.
- On February 16, 1995, the Assistant Secretary for Environment, Safety and Health provided to the Board staff names of Department officials responsible for the Implementation Plan for Recommendation 91-6.
- On February 16, 1995, the Assistant Secretary for Environment, Safety and Health provided the final report of the Infrastructure Evaluation Team.
- On February 21, 1995, the Department transmitted to the Board an acceptance letter for Recommendation 94-5.

- On February 22, 1995, the Assistant Secretary for Environmental Management responded to the Board concerning their May 11, 1994/December 13, 1994 letters, regarding the rate of meeting the commitments of Recommendation 93-5.

- On February 23, 1995, the Assistant Secretary for Defense Programs responded to the Board concerning their January 20, 1995 letter regarding the Department's Qualification Evaluation Process.

- On February 24, 1995, the Department transmitted to the Board its request for an additional 45 days to prepare its Implementation Plan for Recommendation 94-3.

- On February 24, 1995, the Department transmitted to the Board the Implementation Plan for Recommendation 94-4.

- On February 28, 1995, the Department transmitted to the Board the Implementation Plan for Recommendation 94-1.

- On March 6, 1995, the Assistant Secretary for Defense Programs transmitted a response to the Board's letter of November 25, 1994, concerning the Los Alamos National Laboratories.

- On March 6, 1995, the Deputy Assistant Secretary for Military Application and Stockpile Support transmitted to the Board the Implementation Plan for Recommendation 93-1 Action 4 Report/Nuclear Explosive Safety Study Corrective Action Plan.

- On March 27, 1995, the Deputy Assistant Secretary for Military Application and Stockpile Support forwarded to the Board the March 1995 deliverables scheduled in the Department's 94-4 Implementation Plan. These deliverables included: revised contractor criticality safety approval process documents; and contractor and Oak Ridge Operations Office implementing procedures for Department Order 5480.31, Startup and Restart of Nuclear Facilities.

- On April 12, 1995, the Assistant Secretary for Environmental Management transmitted a letter to the Board providing a process for implementing Recommendation 94-3, Rocky Flats Seismic and Systems Safety.

- On April 19, 1995, the Secretary submitted the annual written report to Congress, for calendar year 1994, concerning the Department's activities in response to Recommendations and other interactions with the Defense Nuclear Facilities Safety Board.

- On April 28, 1995, the Deputy Assistant Secretary for Military Application and Stockpile Support forwarded to the Board the April 1995 deliverables called for in the Department's 94-4 Implementation Plan. These deliverables included: the contractor's evaluation of the nuclear criticality safety program supporting the first resumption area and special operations to date; the Oak Ridge Operations Office corrective action plan developed from the corrective actions recommended in the Department's assessment report of October 13, 1994; and the Department's first quarterly status report for Recommendation 94-4.

- On May 5, 1995, the Assistant Secretary for Environmental Management transmitted the sixth quarterly status report for Recommendation 93-4 to the Board.

- On May 24, 1995, the Department transmitted to the Board its quarterly status report for the second quarter of Fiscal Year 1995 on Recommendation 93-2.

- On May 26, 1995, the Deputy Assistant Secretary for Research and Development forwarded to the Board a report assessing the role of Defense Programs line management in safety issues at Y-12. This report fulfilled a commitment of the Recommendation 94-4 Implementation Plan.

- On June 2, 1995, the Deputy Assistant Secretary for Military Application and Stockpile Support forwarded to the Board the May 1995 deliverables scheduled in the Department's 94-4 Implementation Plan. These deliverables included: the contractor's corrective action plan for the deficiencies identified in the evaluation of the nuclear criticality safety program; and the contractor's assessment of the current conduct of operations posture.

- On June 5, 1995, the Secretary transmitted to the Board a 45-day extension request for the Recommendation 94-5 Implementation Plan.

- On June 5, 1995, the Assistant Secretary for Environmental Management transmitted a letter which notified the Board that there was a change in a milestone responding to Recommendation 90-7, Hanford Waste Tanks.

- On June 29, 1995, the Secretary transmitted a letter which informed the Board that funding information, requested in a Board letter of April 24, 1995, regarding radiological protection programs at defense nuclear facilities, would be delayed until July 21, 1995.

- On June 29, 1995, the Secretary transmitted to the Board the acceptance letter for Recommendation 95-1, Improved Safety of Cylinders Containing Depleted Uranium.

- On June 30, 1995, the Under Secretary transmitted to the Board the Annual Report deliverable for Recommendation 92-5, Discipline of Operations in a changing Defense Nuclear Facilities Complex.

- On June 30, 1995, the Secretary transmitted to the Board the Implementation Plan for Recommendation 94-3, Rocky Flats Seismic and Systems Safety.

- On June 30, 1995, the Deputy Assistant Secretary for Military Application and Stockpile Support forwarded to the Board the June 1995 deliverables called for in the Department's 94-4 Implementation Plan. These deliverables included: the Defense Programs line management corrective action plan for the deficiencies identified in the DP-13 assessment of the line management role in Y-12 safety issues; and the Training Assistance Team program to evaluate key Federal personnel, other than those in the Office of Environment, Safety and Health, involved with safety related activities at defense nuclear facilities at Y-12.

- On July 6, 1995, the Under Secretary transmitted to the Board a letter which responded to a Board letter of February 3, 1995, regarding Order 4700.1, Project Management System. The letter discusses future cancellation of Order 4700.1 and the promulgation of the Life Cycle Asset Management Directive.

- On July 7, 1995, the Secretary transmitted to the Board a letter which informed the Board of a forthcoming revised Implementation Plan for Recommendation 93-6, Maintaining Access to Nuclear Weapons Expertise in the Defense Nuclear Facilities Complex.

- On July 11, 1995, the Secretary transmitted to the Board a letter which informed the Board of the Department's decision to stop work on two of six commitments which were determined to be unnecessary in the Implementation Plan for Recommendation 93-5, Hanford Waste Tank Characterization Studies. The commitments addressed testing for ferrocyanide materials within core segments removed from waste tanks.

- On July 12, 1995, the Assistant Secretary for Environment, Safety and Health transmitted a letter to the Board which reported on the status of past Department oversight activities at the Y-12 Plant and other Oak Ridge Site facilities. The report addressed issues relevant to Recommendation 94-4, Deficiencies in Criticality Safety at Oak Ridge, Y-12.

- On July 21, 1995, the Assistant Secretary for Environment, Safety and Health sent a letter to the Board which responded to the Board's letter of June 30, 1995 concerning statements to the Subcommittee on Energy and Water Development of the House Committee on Appropriations, House of Representatives on March 8, 1995.

- On July 21, 1995, the Secretary transmitted to the Board the Implementation Plan for Recommendation 94-5, Integration of Department Safety Rules, Orders and Other Requirements.

- On July 28, 1995, the Deputy Assistant Secretary for Military Application and Stockpile Support forwarded to the Board the July 1995 deliverables scheduled in the Department's 94-4 Implementation Plan. These deliverables included: the Department's criticality safety assessment program, incorporating commitments 2.1 and 3.4; the contractor's criteria for a self assessment of the criticality safety program; and the Department's second quarterly status report.

- On July 31, 1995, the Deputy Assistant Secretary for Military Application and Stockpile Support for Defense Programs transmitted deliverables to the Board required to fulfill commitments under the Action 4 Report for Recommendation 93-1.

- On August 24, 1995, the Deputy Assistant Secretary for Military Application and Stockpile Support for Defense Programs transmitted a letter to the Board notifying them of the status of resuming nuclear operations at Oak Ridge, Y-12.

- On August 31, 1995, the Deputy Assistant Secretary for Military Application and Stockpile Support forwarded to the Board the August 1995 deliverables called for in the Department's 94-4 Implementation Plan. These deliverables included: a contractor closure report for the deficiencies associated with the readiness for inspection of the Receipt, Storage and Shipment (RSS) mission area at Y-12; a contractor report outlining compensatory measures related to criticality safety program implementation at RSS; and a contractor report outlining use of mentors as a compensatory measures for conduct of operations program requirements. Deliverables satisfying commitment N.4.2 for the RSS mission area were also forwarded. They included: the contractor line management certification letter to commence their readiness assessment; the contractor's plan of action, implementation plan, readiness assessment report, and readiness to proceed memorandum with endorsements; and the Department's plan of action and implementation plan for the RSS readiness assessment.

- On September 15, 1995, the Principal Deputy Assistant Secretary for Defense Programs transmitted a letter to the Board forwarding a report "Managing the Safety of Defense Nuclear Research and Development Activities." This report responds to a Board letter of April 28, 1995 which raised issues concerning effective means of managing the safety of research and development while maintaining the flexibility needed to conduct Research and Development in support of national security objectives. The letter also commits the Department to briefing the Board within 60 days on progress made to establish integrated safety management systems.

- On September 15, 1995, the Deputy Assistant Secretary for Nuclear and Facility Safety sent a letter to the Board which forwarded the

Department Standards Committee Action Matrix. The matrix outlines the action items approved by the Department Standards Committee to integrate and coordinate all standards-related activities. This also fulfills Commitment 2.2 of the Implementation Plan for Recommendation 94-5.

- On September 19, 1995, the Secretary sent a letter to the Board responding to the Board's April 24, 1995 letter concerning funding of radiological protection programs at defense nuclear facilities.

- On September 27, 1995, the Assistant Secretary for Environmental Management transmitted a letter to the Board which addressed criticality safety at Rocky Flats as it related to concerns raised in Recommendation 94-4.

- On September 28, 1995, the Assistant Secretary for Environmental Management forwarded a letter to the Board which included a Generic Technical Management Plan as a deliverable required by the Implementation Plan for Recommendation 93-4, Environmental Restoration Management Contracts.

- On October 3, 1995, the Deputy Assistant Secretary for Military Application and Stockpile Support forwarded to the Board the September 1995 deliverables scheduled in the Department's 94-4 Implementation Plan. These deliverables included: a Defense Programs report documenting the continued participation of Defense Programs line management and support staff in the Y-12 resumption process; the Department's Training Assistance Team program for the evaluation of key contractor personnel involved with safety related activities at defense nuclear facilities at Y-12; and the Department's readiness assessment report for the Receipt, Storage and Shipment (RSS) mission area.

- On October 11, 1995, the Assistant Secretary for Environmental Management forwarded a letter to the Board which responded to the Board's letters of April 17, 1995 and October 6, 1995 concerning exercise "Ready 94" at the Rocky Flats Environmental Technology Site.

- On October 11, 1995, the Assistant Secretary for Environmental Management forwarded a letter to the Board which provided a progress report on the preliminary evaluations of seismic safety of Building 371 at Rocky Flats. This letter also forwarded a revised schedule which reflects a change in the completion date for Phase I in the Implementation Plan for Recommendation 94-3, Rocky Flats Seismic and System Safety.

- On October 16, 1995, the Secretary forwarded to the Board the Implementation Plan for Recommendation 95-1, Improved Safety of Cylinders Containing Depleted Uranium.

- On October 19, 1995, the Assistant Secretary for Defense Programs forwarded the Department's annual report of activities related to the implementation of Recommendation 93-2, Critical Facilities Infrastructure.

- On October 23, 1995, the Assistant Secretary for Environmental Management forwarded a letter which responded to the Board's letter of August 3, 1995. The letter addressed the failure of Department and contractor personnel at Rocky Flats to recognize the safety implications of known and apparent structural problems in Buildings 776/777 and 771.

- On November 1, 1995, the Assistant Secretary for Defense Programs forwarded the fourteenth and final bimonthly report on the implementation of Recommendation 92-6. The report covered the period of activities through September 30, 1995.

- On November 3, 1995, the Deputy Assistant Secretary for Military Application and Stockpile Support forwarded to the Board the October 1995 deliverables called for in the Department's 94-4 Implementation Plan. These deliverables included: the Department's conduct of operations assessment plan for separate evaluations of contractor conduct of operations implementation and the Department's conduct of operations oversight and support; the Training Assistance Team Report evaluating key Federal personnel, except EH personnel, involved with safety related activities at defense nuclear facilities at Y-12; the Department's third quarterly status report, containing an update of activities occurring between July 1 and September 30, 1995; and the completed items from commitment N.4.2 associated with the Depleted Uranium Operations (DUO) mission area. The specific DUO deliverables were: the contractor readiness to proceed memorandum with endorsements and the contractor readiness assessment report.

- On November 7, 1995, the Assistant Secretary for Environmental Management forwarded a letter to the Board concerning Recommendation 94-1. The letter informed the Board that the Department would be delayed by four weeks in completing the milestone of "Repackaging 256 items of plutonium metal in contact with plastic at Rocky Flats by October 31, 1995."

- On November 8, 1995, the Assistant Secretary for Environment, Safety and Health forwarded a letter to the Board concerning Recommendation 94-4, Deficiencies in Criticality Safety at Y-12. The letter forwarded, as a deliverable, the Environment, Safety, and Health's Office of Oversight Training Team Assessment Plan and Report of Environment, Safety, and Health Residents at the Oak Ridge Site. This deliverable fulfilled commitments 5.1 and 5.2 of the Recommendation 94-4 Implementation Plan.

- On November 30, 1995, the Principle Deputy Assistant Secretary for Defense Programs transmitted to the Board the Recommendation 90-2 Quarterly Status Report for April 1, 1995 to June 30, 1995.

- On November 30, 1995, the Deputy Director of the Office of Nuclear Energy, Science and Technology forwarded a letter to the Board that enclosed the Systems Requirements Document. The Systems Requirements Document was the first deliverable identified in the Department's Implementation Plan for Recommendation 95-1, Improved Safety of Cylinders Containing Depleted Uranium.

- On November 30, 1995, the Deputy Secretary forwarded a letter to the Board which enclosed the Nuclear Materials Stabilization Task Group Quarterly Report (June 1 to August 31, 1995) on the implementation of Recommendation 94-1.

- On December 1, 1995, the Secretary forwarded a letter to the Board requesting a 45-day extension to respond to Recommendation 95-2, Safety Management.

- On December 1, 1995, the Assistant Secretary for Environmental Management forwarded the Department's eighth quarterly status report for Recommendation 93-4.

- On December 1, 1995, the Assistant Secretary for Environment, Safety and Health forwarded a letter to the Board concerning Recommendation 91-6, Radiation Protection. The letter reported that the management action plan was completed in October 1995 and is being reviewed. The letter reported that the management action plan final report would be forwarded to the Board in December 1995.

- On December 4, 1995, the Deputy Secretary forwarded a letter to the Board addressing concerns the Board addressed in their letters of November 2 and 21, 1995. The Deputy Secretary discussed: substitutes for automatic termination clauses for Department nuclear safety orders, "crosswalk" of revised Department orders, status of guidance documents, and Department responsibilities to provide the Board with all the documents that they require in order to carry out their statutory responsibilities.

- On December 6, 1995, the Deputy Assistant Secretary for Military Application and Stockpile Support forwarded to the Board the November 1995 deliverables scheduled in the Department's 94-4 Implementation Plan. These deliverables included: the Department's assessment report on the adequacy of the contractor's Criticality Safety Approvals and Operational Safety Requirements associated with nuclear operations at the Y-12 Plant; the contractor's evaluation of its criticality safety program; the conduct of operations assessment reports for separate evaluations of contractor conduct of operations implementation and the Department's conduct of operations oversight and support; and the final deliverable of commitment N.4.2 for the Receipt, Storage, and Shipment (RSS) mission area, the contractor closure validation report associated with the restart of RSS.

- On December 8, 1995, the Assistant Secretary for Environmental Management requested an extension from the Board until February 16, 1996 to respond to Board letters of June 15 and July 21, 1995. The subject of the Board letters was an evaluation of design, construction, operation and maintenance of ventilation systems at the Department's plutonium processing and handling facilities.

- On December 28, 1995, the Assistant Secretary for Environment, Safety and Health forwarded a letter to the Board which responded to the Board's letter to the Secretary on December 5, 1995. The letter provided the Department's commitment to provide to the Board a draft of the revised Functions and Responsibilities Manual by February 1, 1996

- On December 29, 1995, the Assistant Secretary for Environmental Management forwarded a letter to the Board which provided Phase I results of Recommendation 94-3, Seismic and Systems Safety, regarding the interim storage of plutonium at Rocky Flats and the revised Integrated Program Plan schedule

- On December 29, 1995, the Assistant Secretary for Environment, Safety and Health forwarded a letter to the Board which provided an Office of Oversight Corrective Action Plan for EH Residents at Oak Ridge as a deliverable under the Recommendation 94-4 Implementation Plan

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